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The FOREST RESOURCES of WEST VIRGINIA

FOREST SERVICE RESOURCE BULLETIN NE-56
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FOREST SERVICE, U. S. DEPARTMENT OF AGRICULTURE
NORTHEASTERN FOREST EXPERIMENT STATION
370 REED ROAD, BROOMALL, PA 19008

FOREWORD

Under the authority of the McSweeney-McNary Forest Research Act of May 22, 1928, and subsequent amendments, the Forest Service, U. S. Department of Agriculture, conducts a series of continuing forest surveys of all states to provide up-to-date information about the forest resources of the Nation.

This is a report on the latest forest survey of West Virginia. It supersedes two previous reports published in 1952 and 1964. The Northeastern Forest Experiment Station staff during this most recent effort had the excellent help and cooperation of the West Virginia Department of Natural Resources.

The resurvey of the State was directed by Carl E. Mayer, Resources Evaluation Project Leader. He was assisted by Joseph E. Barnard, who was responsible for the design of the inventory and sample selection as well as for supervision of data compilation. John R. Peters supervised the photo interpretation and the data collection by field crews. David R. Dickson applied the generalized data processing system, FINSYS, to the specific data needs of the West Virginia inventory and produced summary tables for the State and by counties and units. Teresa M. Bowers assisted in the inventory design by performing all the calculations necessary for sample-size determination and plot selection. She was responsible for the coordination of key-punching and other data-preparation tasks and the final preparation and statistical checking of tables for the report. James T. Bones, with the assistance of State personnel, collected and compiled the data on current utilization levels, timber products output, and harvesting and manufacturing residues. He was assisted in the compilation phase by David R. Dickson and Teresa M. Bowers. Carmela M. Hyland was responsible for administrative and secretarial services.

This report summarizes the forest resource situation and the changes that have occurred since the previous inventory. Data for the Monongahela National Forest were supplied by the forest and updated for inclusion in the report. Those who need more detailed information or analysis than is presented herein should contact the Resources Evaluation project, Northeastern Forest Experiment Station, 370 Reed Road, Broomall, Pennsylvania 19008. Users of this report are strongly advised to read carefully the definitions of forest survey terms and the section on the reliability of the estimates in the appendix of this report.

COVER PHOTO: Kanawha Falls at the headwaters of the historic Kanawha River (Courtesy of Wonderful West Virginia Magazine).

by James T. Bones

The FOREST RESOURCES of WEST VIRGINIA

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Mountain State overview (Courtesy of Wonderful West Virginia Magazine).

Abstract

A statistical and analytical report of the third forest survey of West Virginia by the Forest Service, U. S. Department of Agriculture. Findings are based on the remeasurement of 1/5-acre plots and new 10-point cluster plots. This report analyzes trends in forest land area, timber volume, annual growth, and timber removals. Timber products output by forest industries, based upon a canvass of industries in 1974, and the importance of timber and forests to the State's economy and environment are also discussed. The report includes a discussion of the outlook for timber supplies during the next 30 years, a discussion of resource management opportunities, and 65 tables of statistical data.

INTRODUCTION

THIS REPORT PRESENTS a discussion and analysis of the results of the third forest survey of West Virginia, completed in 1975. The first forest survey of West Virginia was begun in 1948 (Wray 1952) and the second in 1959 (Ferguson 1964). Through the years many definitions, procedures, and methods have changed as a result of improved forest-inventory and data processing techniques. To analyze actual trends between forest surveys, the estimates from the previous survey were adjusted to make them comparable with those of the current survey. The 1949 and 1961 estimates are valid for the procedures and definitions used then. The changes in commercial forest area and in growing-stock and sawtimber volume, after adjustment of the 1961 data to current standards, are:

CHANGE IN AREA AND VOLUME, 1961-1975

	1961	*1975*	*Change*
Commercial forest land (thousand acres)	11,389.0	11,483.7	+94.7
Growing-stock volume (million cubic feet)			
Softwoods	557.0	995.0	+438.0
Hardwoods	10,320.0	12,520.4	+2,200.4
Total	10,877.0	13,515.4	+2,638.4
Sawtimber volume (million board feet)			
Softwoods	1,378.0	2,599.7	+1,221.7
Hardwoods	20,560.0	25,031.1	+4,471.1
Total	21,938.0	27,630.8	+5,692.8

This report summarizes the present timber-resource situation and highlights some of the changes that have taken place between surveys. Trends in the inventory and the timber supply are discussed and the future supply is projected. In addition, other important natural resources of West Virginia are identified and analyzed in the light of future user requirements and their compatability with other resource uses.

Three geographic units

To obtain data other than state totals, the State was divided into three geographic sampling units for the current resurvey. These units consist of from 14 to 22 counties; each unit was treated as a homogeneous entity for sampling. The amount of commercial forest land in the three units ranges from 3 to 4.4 million acres.

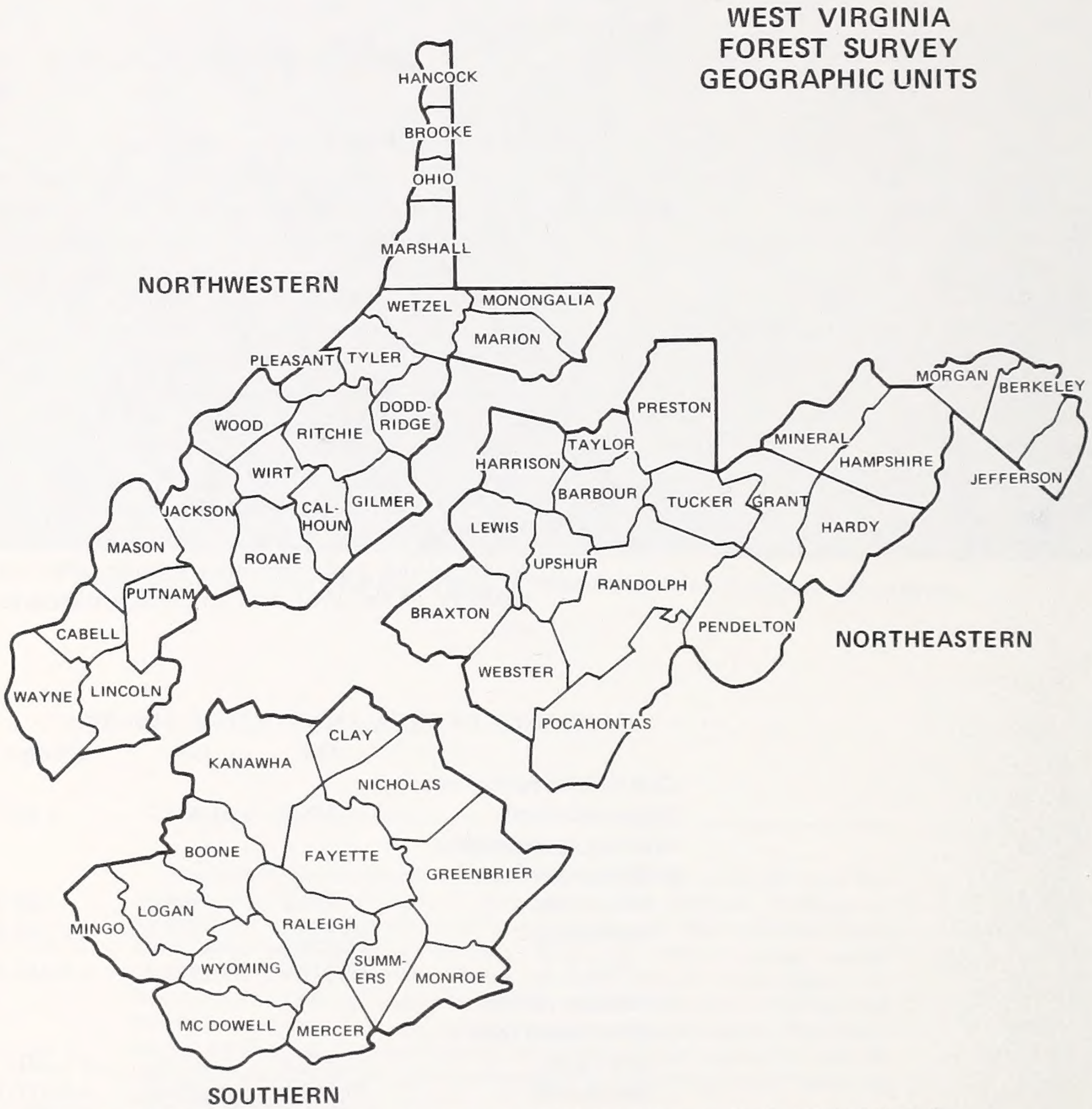


Figure 1.—Forest-survey geographic sampling units in West Virginia.

In the initial forest survey, seven sampling units with irregular boundaries were recognized. During the 1961 forest survey, although the three current geographic units were identified, the national forests were carried as a fourth separate unit. We plan to use the three geographic units defined for this reinventory as the basic units for future surveys, to permit comparisons of trends at less than the statewide level.

Sampling the resource

In the current resurvey a large number of the original 1949 field plots were remeasured to provide estimates of average annual net timber growth, average annual timber removals, and land-use change, and to update the 1949 forest inventory volume estimates. To develop an independent second estimate, new field plots were established and measured. These two samples yielded independent estimates, which were weighted and combined to give current estimates of forest area and timber volume. A more detailed discussion of the design and sampling procedure is included in the appendix.

Sampling errors, which indicate the reliability of the estimates, are presented in the appendix and as columns in the individual tables. Users of these timber-resource data are strongly advised to read the definitions and explanations of these statistics carefully.

SIGNIFICANT FINDINGS

Forest area

- The forest area is 11.6 million acres, 75 percent of the land area in the State. Only 1 percent of the total forest area is classed as productive reserved or unproductive forest land.
- The commercial forest area has increased 16 percent, from 9.9 million acres in 1949 to 11.5 in 1975. Reversion of pastureland to forest cover is responsible for much of the increase.
- Sawtimber stands occupy 44 percent of the commercial forest land and private landowners own 89 percent of the sawtimber area.
- Oak-hickory is the principal forest type; it covers 59 percent of the commercial forest.

Timber volume

- There are 15.6 billion cubic feet of timber in the commercial forests of the State, 87 percent of which is in growing-stock trees.
- More than 84 percent of the 13.5 billion cubic feet of growing stock and 83 percent of the 27.6 billion board feet of sawtimber on commercial forest land is privately owned.
- Oaks account for 40 percent of the growing-stock volume and 43 percent of the sawtimber volume.
- Total growing-stock volume has increased 24 percent from 10.9 billion cubic feet in 1961 to 13.5 billion cubic feet in 1975.

Stand conditions

- Eighty-two percent of the commercial forest land is fully stocked with live trees, but only 30 percent is fully stocked with growing-stock trees.
- One in every four hardwood trees and one in every eight softwood trees is considered unmerchantable because it is grossly defective, poorly formed, or of a noncommercial species.
- The volume of hardwood sawtimber in grade 3 logs has increased from 37 percent of the total in 1949 to 46 percent in 1975. An increase in the volume in 12- and 14-inch dbh trees is responsible for much of this increase.
- During the last 14 years average annual net growth has been more than twice average annual removals for both growing stock and sawtimber in West Virginia.

Timber use

- Total output of timber products in 1974 was 136.2 million cubic feet, 81 percent of which was from round timber.
- Eighty-three percent of the timber products output in 1974 was from hardwood growing-stock trees and nearly two-thirds of the timber harvest went to sawmills for lumber.
- West Virginia has no pulpmills, but 213,600 cords of pulpwood were harvested and 198,500 cord equivalents of chipped manufacturing residues were recovered and shipped to pulpmills in neighboring states in 1974.
- Total-tree harvesting systems are operating successfully in the State; about 3 percent of the pulpwood harvest came from total-tree chips.

Other natural resources

- The water supply is adequate, at the current level of consumption, but water quality is of increasing concern to local resource managers.
- Demand for wildlife resources has been growing; an estimated 296,000 licensed hunters and 304,000 licensed fishermen will be using the resource by the year 2000.
- Current land use trends favor increasing populations of gray squirrels, wild turkeys, and warm water fish, and declining populations of white-tailed deer, bobwhite quail, and trout.

TIMBER RESOURCE SITUATION

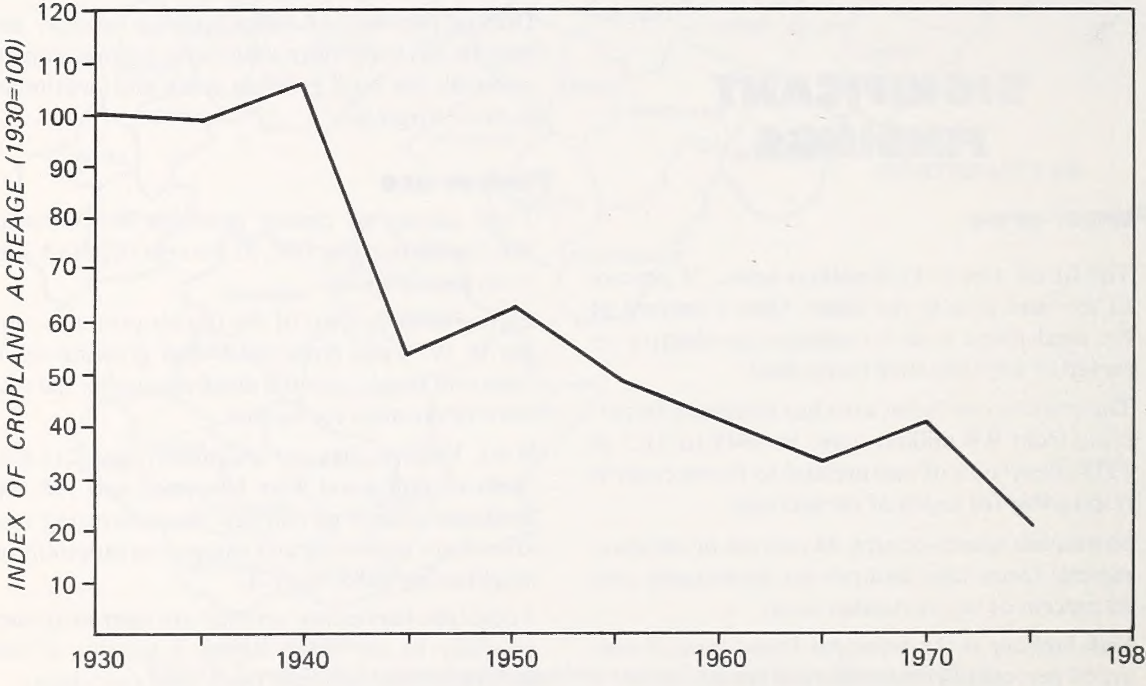
More than 75 percent in forest cover

More than 75 percent of the land area of West Virginia is covered by forests. Of the remaining 25 percent, nearly 4 percent of the total land area is classed as cropland and 9 percent is classed as pasture. The balance of the nonforest land is in swampland, and industrial and urban areas. The 11.5 million areas of land that support forests of commercial value in West Virginia represents 74 percent of the total land area.

Land-use changes between the present forest survey and the 1949 and 1961 surveys resulted in a 16 percent overall increase in commercial forest acreage. Area increased from about 9.9 million acres in 1949 to 11.4 million acres in 1961, and finally to 11.5 million acres in 1975. Cropland acreage decreased by 1,096,000 acres between 1950 and 1974 (Fig. 2). This decrease was considered significant, since most of this loss represents a permanent redirection of land into such irreversible uses as highways and residential and commercial development. The loss in acreage of pastureland between 1949 and 1975 was approximately equal to the gain in commercial forest land. Apparently one product of increased fire protection and a decline in family farming during the last quarter century was the reversion of about 2 million acres of pastureland to forest cover in West Virginia.

Most of the gain in commercial forest land acreage has occurred in the Northeastern and Northwestern geographic units of the State. These changes in the three geographic units and the national forest land are:

Figure 2.—Change in cropland acreage in West Virginia since 1930.



The land-use change brought on by the federal highway construction program in West Virginia during the past decade typifies those irreversible changes that permanently reduce the commercial forest land base.

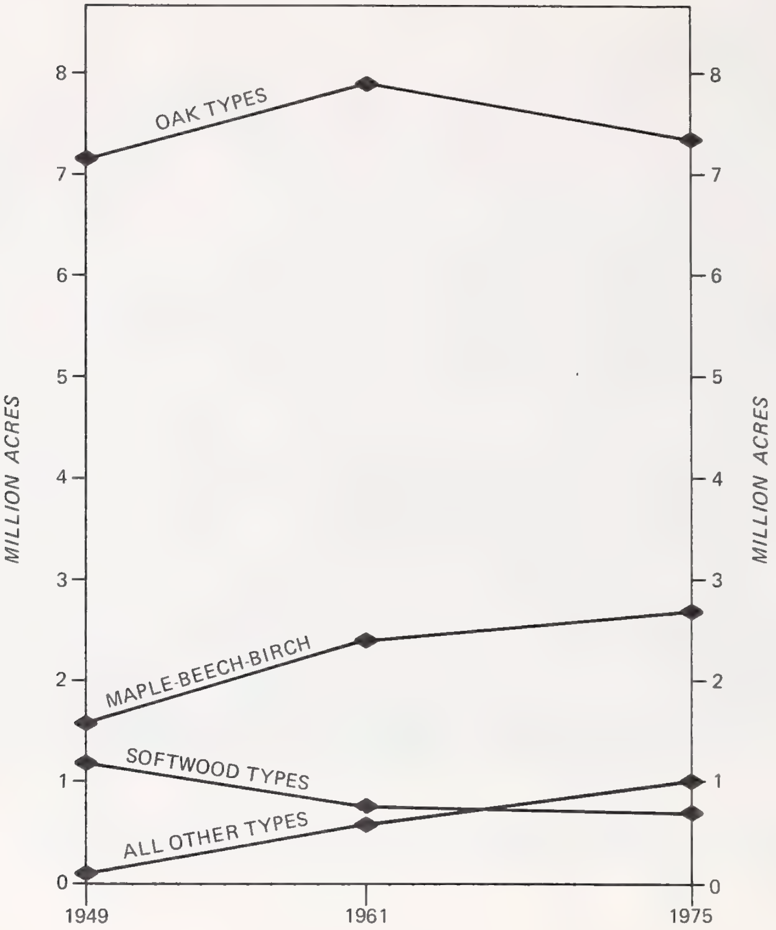
Unit	*1949*	*1961*	*1975*
	(million acres)		
National forest land	0.9	0.9	0.9
Northeastern Unit	3.0	3.4	3.6
Southern Unit	3.7	4.0	3.8
Northwestern Unit	2.3	3.1	3.2
State total	9.9	11.4	11.5

The area of forest classed as sawtimber has risen slightly since 1949, but it has decreased since 1961 from 5.6 million acres to 5.1 million acres. The comparison of stand area in sawtimber between the 1961 and 1975 resurveys represents a true difference, since the definition of sawtimber stands remained the same. In 1949, however, sawtimber stands were segregated on a volume-per-acre base rather than by area occupancy. The area in poletimber stands increased between 1961 and 1975 by nearly 0.9 million acres, while the acreage in seedling and sapling stands remained more or less unchanged. The area in stands of all size classes but sawtimber increased on public lands in West Virginia between surveys, while area in all size classes but poletimber decreased on private lands.

A forest type classification was used during the survey that segregated commercial forest area into 24 local types. These local types were in turn aggregated into 8 major types. Since the forest type classification system used during the previous forest survey is consistent with the current one, the differences in the acreage of the various types between surveys represent true differences.

Overall, since 1949, the area in hardwood types has increased and the area in softwood types has decreased (Fig. 3). Although the commercial forest land area increased 16 percent between 1949 and 1975, the area in the spruce-fir and Virginia and pitch pine types decreased about 44 percent.

Figure 3.—Changes in commercial forest area, by forest types, 1949-1975.

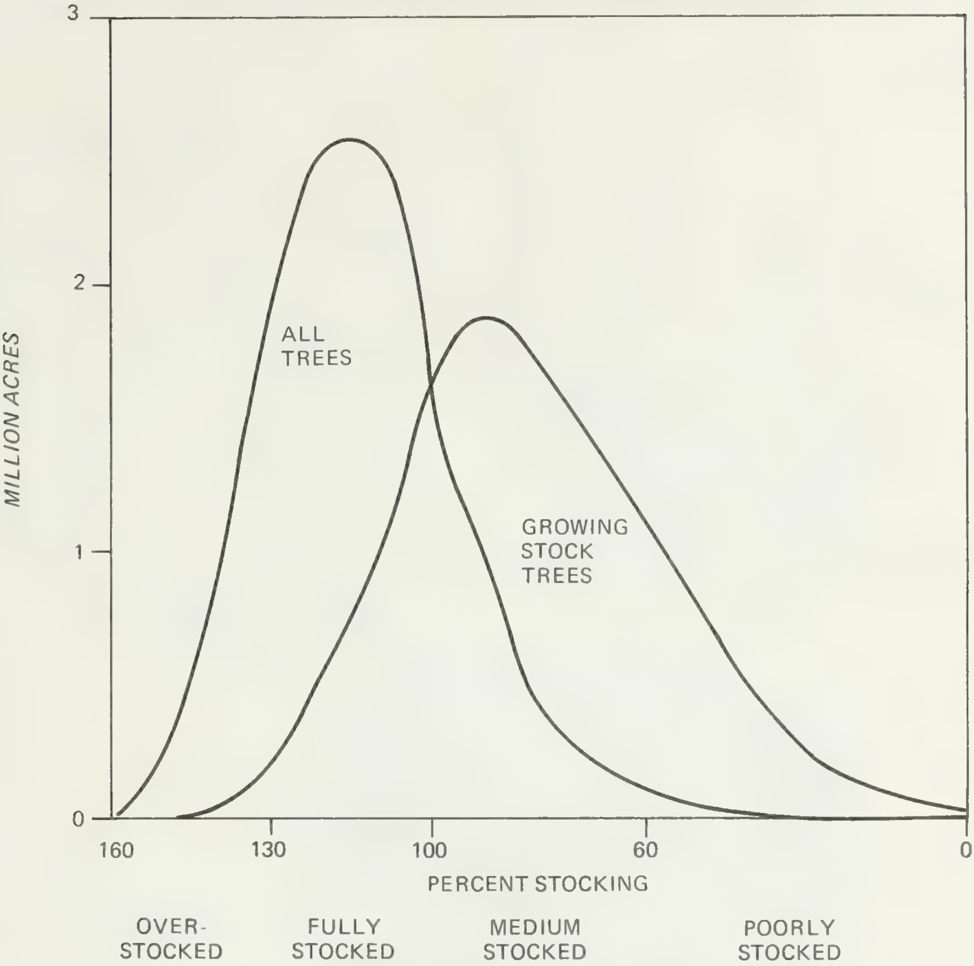


This significant reduction in softwood area has been partially offset by an increase in the acreage in the white and red pine type from 71,000 acres in 1949 to 101,000 acres in 1975. In West Virginia this type contains the white pine and hemlock local forest types.

During the period the acreage in the oak-hickory type, which occupies 60 percent of the total commercial forest area, has remained virtually the same. The maple-beech-birch type and the oak-pine type, however, have expanded to sites that were once occupied by softwood types. Flood protection along with control of land use along many of West Virginia's major rivers and streams during the 1950's has resulted in an increase in the acreage of the elm-ash-cottonwood type from 27,000 acres in 1949 to 815,000 acres in 1975. A major component of this type is red maple.

We consider an acre fully stocked if it contains 75 to 100 square feet of basal area. By this standard, 82 percent of the area of commercial forest land was either fully stocked or overstocked with live trees in 1975 (Fig. 4). At first glance such a high percentage of the total growing space being 100 percent or more stocked would seem to indicate that the forested acreage is being extremely well utilized. However, only 30 percent of the area of commercial forest land is considered to be fully stocked or overstocked with growing-stock trees. This means that defective and poorly formed trees—those classed as rough or rotten—are a large enough component in 52 percent of the stands to exclude them from the fully stocked category. One in every four hardwood trees and one in every eight softwood trees is either poorly formed, highly defective, or of a noncommercial species.

Figure 4.—Area of commercial forest by stocking classes, 1975.



A 24 percent volume increase

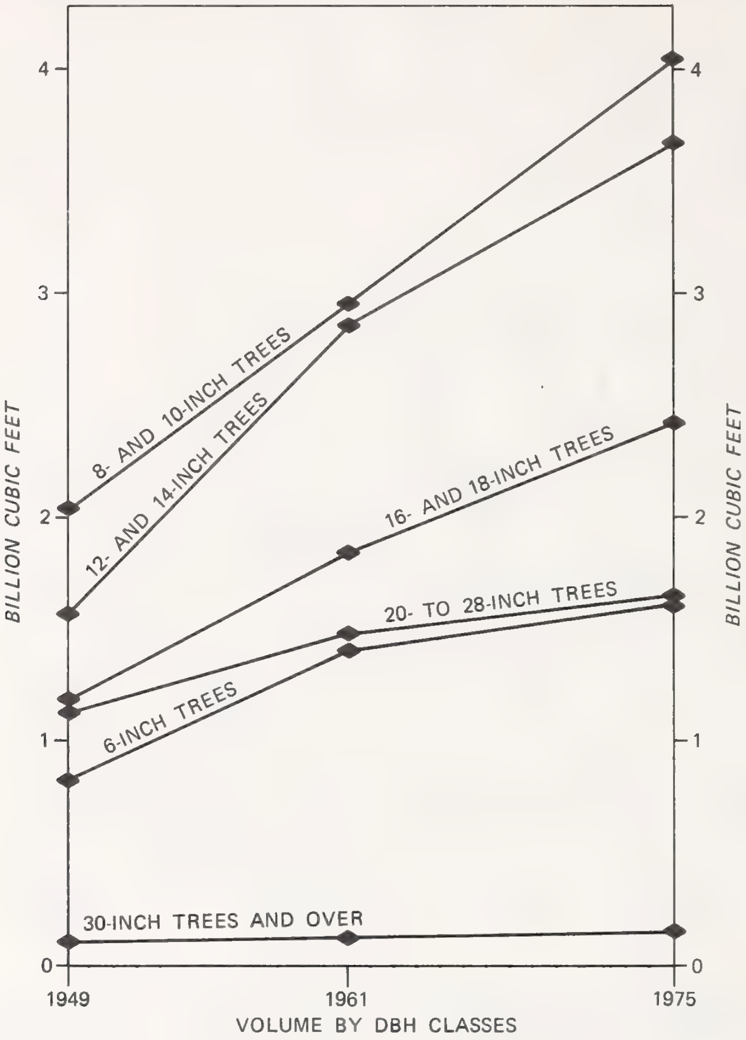
The total volume of growing stock (all commercial tree species 5.0 inches dbh and larger) rose from 10.9 billion cubic feet in 1961 to 13.5 billion in 1975—a 24 percent increase. However, this increase was not evenly distributed among species groups or diameter classes. Softwood volume gained 79 percent during the period, while hardwood volume gained only 21 percent. The cubic-foot volume in the 6- to 10-inch dbh and 12- to 18-inch dbh classes rose 27 percent each, while the volume in 20- to 28-inch dbh trees rose only 8 percent (Fig. 5). Highest individual volume gain was in the 10-inch dbh class—40 percent.

The uneven distribution of tree sizes and the high incidence of defect is reflected in the sawtimber trend. The volume in sawtimber trees (growing-stock trees 9.0 inches dbh and larger for softwood and 11.0 inches and larger for hardwoods) increased 26 percent—from 21.9 to 27.6 billion board feet. The volume in sawtimber trees 10 to 18 inches dbh increased 34 percent, but the volume in trees 20 inches dbh and larger increased only 6 percent.

In addition to the 13.5 billion cubic feet of growing stock, there is nearly 1.4 billion cubic feet of sound wood in rough rees and 613 million cubic feet in rotten trees on commercial forest land. This wood is available for recovery and use in fiber products even though the trees are classified as too crooked or too rotten to be used for such solid-wood products as lumber or veneer.

The volume of growing stock per acre rose from 955 cubic feet in 1961 to 1,177 cubic feet in 1975. The average volume of sawtimber per acre in-

Figure 5.—Volume of growing stock by diameter classes, 1949-1975.



creased from 1,926 board feet in 1961 to 2,406 board feet in 1975. On national forest lands both growing stock and sawtimber volumes per acre increased. Average volumes per acre are 2,162 cubic feet and 4,791 board feet, well above the statewide average for all ownerships. Likewise, average volumes per acre for forest industry ownerships rose to 1,339 cubic feet and 3,144 board feet. All other public and private ownerships had per-acre volumes that were well below the state averages.

Together, the high per-acre volumes on land in forest industry and national forest ownership in West Virginia account for only 23 percent of the growing stock and 25 percent of the sawtimber volume. Seventy-seven percent of the growing-stock volume and 75 percent of the sawtimber volume is controlled by private corporations and individuals not primarily engaged in timber activities, and by farmers. Since 1961, the growing-stock volume on farmer and miscellaneous private ownerships has increased 1.6 billion cubic feet, from 8.6 billion cubic feet to 10.2 billion in 1975. Sawtimber volume increased 2.5 billion board feet; from 17.6 billion board feet in 1961 to 20.1 billion board feet in 1975. In contrast, total sawtimber volume on public land has increased 1.6 billion board feet, from 3.1 billion board feet to 4.7 billion board feet. Sawtimber volume on forest industry ownerships has increased 1.6 billion board feet, from 1.2 billion board feet to 2.8 billion board feet during the same period.

Grade 3 hardwood logs predominate

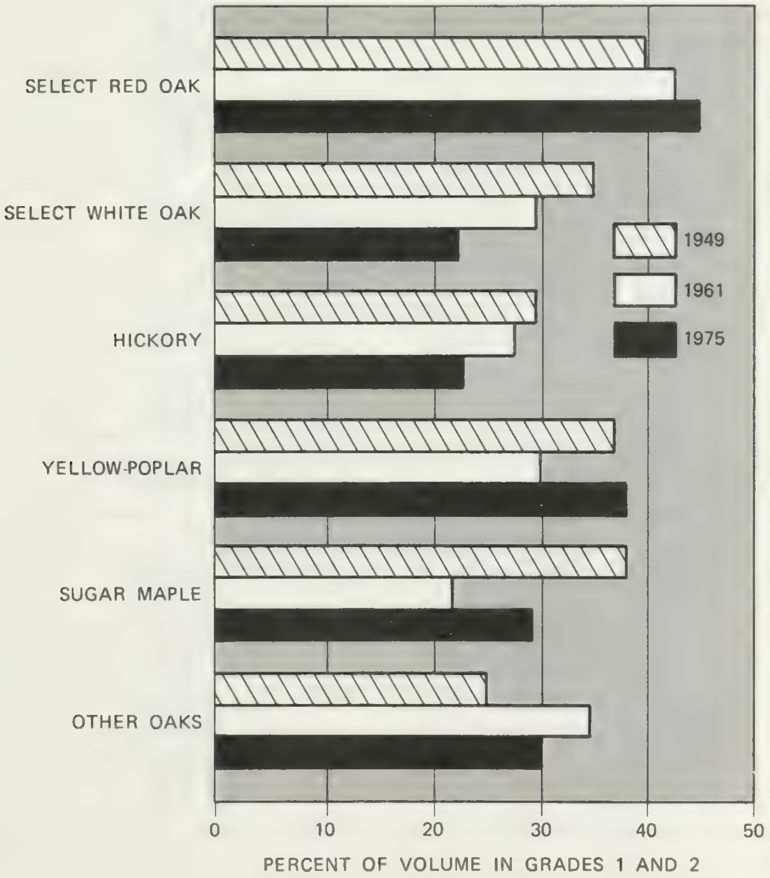
The volume of hardwood sawlogs that met the minimum specifications of the grading rule has increased during the past quarter-century, but most of the increase was in the low-quality grade 3 logs. The following tabulation gives the change in distribution of volume by hardwood log grades for the three inventory years (in percent).

	1949	*1961*	*1975*
Log grade 1	34	10	14
Log grade 2		20	17
Log grade 3	37	45	46
Timber and tie logs	29	25	23

The increase in volume of grade 3 hardwood sawlogs appears to be directly related to a substantial increase in the volume in 12- and 14-inch dbh trees. The log grade rules for hardwood logs usually exclude 12- and 14-inch dbh trees from grade 1, because a grade 1 log must have a minimum diameter of 13 inches inside bark at the small end. It is highly unlikely that a tree with a 14-inch dbh could contain such a log. This restriction, along with the prevalence of live branches on young trees, would tend to lower present sawlog quality. Public forest lands, with their higher per-acre volumes and larger trees, have a higher percentage of grade 1 and grade 2 hardwood volume. Thirty-nine percent of the board-foot volume in hardwood sawtimber trees on the Monongahela National Forest in 1975 was in grade 1 and 2 logs, compared to 31 percent for the State as a whole.

The percentage of volume in grades 1 and 2 hardwood logs has varied among species during the last quarter-century (Fig. 6). The overall qual-

Figure 6.—Quality of hardwood sawtimber.



ity of select white oaks and hickory has tended to decline since 1949, while the quality of select red oaks has improved. In yellow-poplar and sugar maple, quality change has been mixed, but since 1961 the percentage of volume in the better log grades has increased.

Pines were the only softwoods graded for sawlog quality. Only 11 percent of the total pine volume was in grade 1 and 2 sawlog material in 1975.

GROWTH IS TWICE REMOVALS

Growth and removal of timber from the inventory can be considered in several ways. When it is necessary to understand how the inventory changed we discuss the average annual growth and removals (Table 20). This is the estimated volume of growth or removals for a hypothetical average year during the period between inventories. In other cases it is necessary to ask: Is growth or removal for the inventory year representative of the average, or of the trend during the period between inventories? To answer this question we compare the average annual growth or removals with the current (Table 21) or actual (Table 27) level for the inventory year. The volume of growth or removals that would be consistent with the average over the period is called trend-level growth or removal. By comparing this estimate, say for removal, with the reported volume actually removed we can determine whether the inventory year was typical of the trend or higher or lower than the trend. This comparison can be very important in predicting or projecting future timber removals.

Growing-stock volume increased 6.4 billion cubic feet between 1949 and 1961 and 2.6 billion cubic feet between 1961 and 1975, to a total of 13.5 billion cubic feet in 1975. This volume increased because timber removals were less than net growth between inventories—an average annual net change of 188 million cubic feet between 1960 and 1974. Sawtimber volume increased 10.1 billion board feet between 1949 and 1975 to 27.6 billion board feet. Total sawtimber removals were about half of net growth, and the average annual change between 1960 and 1974 was 407 million board feet.

Although annual change in growing stock and sawtimber volume is equal to the difference between net growth and removals, net growth can also be divided into several components. The first two are accretion (growth on the initial inventory) and ingrowth (growth of trees that attain poletimber size between inventories). The sum of these two items is termed gross growth. Net growth is gross growth minus certain losses in merchantability (cull-tree increment and growing stock mortality). Foresters attempt to minimize these two negative growth components through forest management. An unusual change in any of the components of growth can cause substantial changes in the average annual change in the inventory over time. Disease and insect attacks may substantially increase mortality and cull increment. Increased market demand for certain tree species may result in a decreased timber supply of that species.

Because of changes in procedure since 1949, the components of annual change in the inventory can be separated only for the 1960-1974 period. For most species in West Virginia, ingrowth is an important component. Ingrowth made up 43 percent of the average annual gross growth of growing stock. It accounts for such a large portion of the gross growth because of the long period between surveys. The concentration of timber removals in large-diameter trees also affects ingrowth. In 20-inch dbh and larger trees the volume removed was 5 times the net annual growth during the period.

Ingrowth volume of growing-stock trees that grew into the sawtimber class made up 55 percent of the average annual gross growth in sawtimber trees. The volume of trees that died or became cull reduced the gross growth in sawtimber by only 19 percent. Average annual net growth of 664 million board feet exceeded the average annual removals by 407 million board feet.

Removals decreased; growth increased

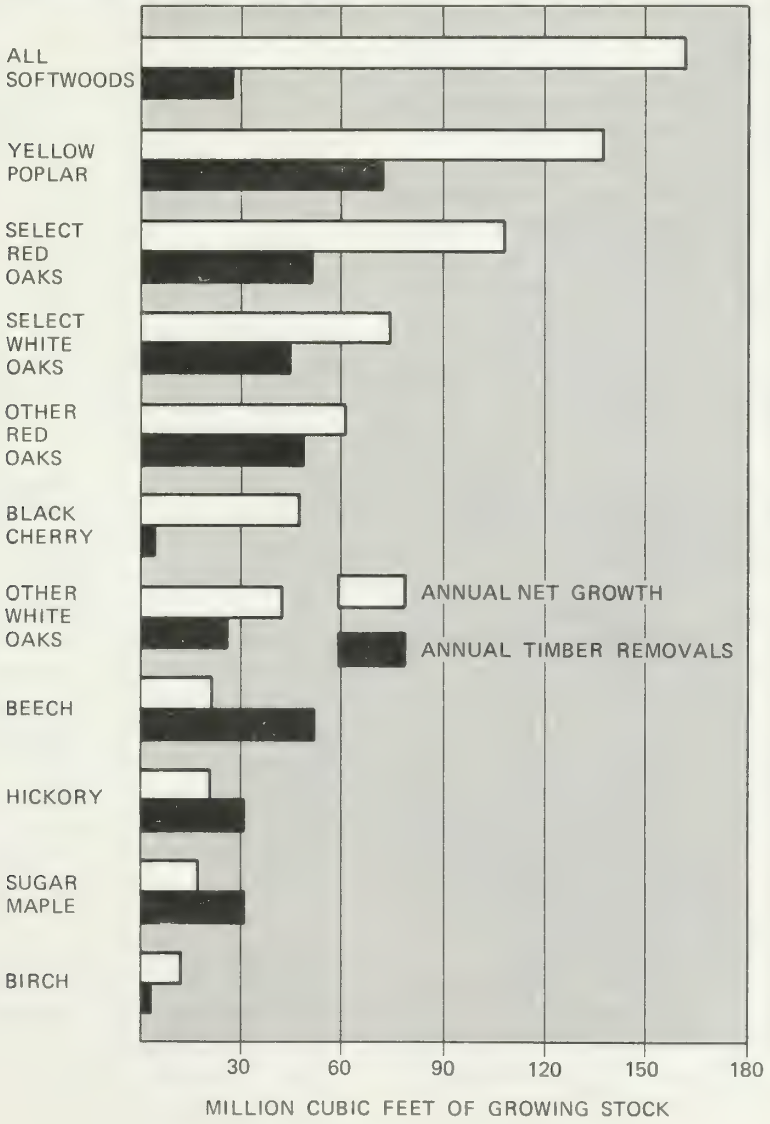
Analysis of the changes that are taking place in the timber inventory of West Virginia shows that removals declined faster than annual net growth increased, but only because of a severe decline in softwood removals between 1949 and 1974. Hardwood removals actually increased during the period from 148 million cubic feet to 155.5 million cubic feet. Softwood removals declined from nearly 13.9 million cubic feet in 1949 to over 10.6 million cubic feet in 1974. Timber removals of growing stock were 35 percent of annual net growth in 1974, compared to 41 percent in 1949.

Even though the rate of decrease for timber removals is greater than the rate of increase of annual net growth for all species together, for certain species more timber could be harvested if markets were available, and for other species the inventory is being depleted because current removals exceed net growth.

The hardwood growing stock situation differs from that of softwoods. The annual net growth of hardwoods in 1974 was 415 million cubic feet, 3.3 percent of the hardwood inventory. Hardwood removals in 1974 (155 million cubic feet) were 37 percent of the net growth. In contrast, the annual net growth of softwood growing stock in 1974 was 59 million cubic feet, 5.9 percent of the inventory. Softwood removals in 1974 (10.6 million cubic feet) were only 18 percent of the net growth.

The oaks had the greatest combined volume of net growth—161 million cubic feet. Together they accounted for 39 percent of the total hardwood net growth in 1974. Timber removals for oak were 65 million cubic feet, 42 percent of the total hardwood removals. The ratio of sawtimber removals to net growth differed between groups of oaks (Fig. 7). For select red and white oaks, more than half of the sawtimber growth was removed in

Figure 7.—Annual net growth and timber removals, by species, West Virginia, 1975.



1974. More than three-fifths of the other white oak sawtimber growth and 79 percent of the other red oak sawtimber growth was removed in 1974. Sawtimber removals exceeded net growth for several other important hardwood species including sugar maple, hickory, and beech.

Yellow-poplar had the greatest volume of growing-stock growth and sawtimber growth in 1974. The 78 million cubic feet and 139 million board feet represented 19 percent of the total hardwood growing stock and 21 percent of the total hardwood sawtimber. Yellow-poplar removals represented only 35 percent of the growing-stock growth and 52 percent of sawtimber growth in 1974.

Growing stock removals and net growth also differed among geographic units in 1974. Although removals averaged 35 percent of the net growth for the entire State, removals ranged from 17 percent of net growth in the Northwestern Unit to 57 percent of net growth in the Southern Unit. Sawtimber removals also varied widely in production of net growth. The ratio of sawtimber removals to net growth ranged from 30 percent in the Northwestern Unit to 106 percent in the Southern Geographic Unit. The high proportion of industrial land in the Southern Unit probably explains the near balance in growth and removals, since this is where much of the timber harvesting in West Virginia is concentrated.

TIMBER-PRODUCTS OUTPUT

Timber removals were compiled in two different ways during the resurvey. The statistics on timber removals in Table 27 were gathered during an independent industry survey and reflect timber removals for one year—1974. Total removals for 1974 can be divided into timber products output (Tables 25 and 26); logging residue that was generated by the harvest of 99 million cubic feet of roundwood products in 1974; and other removals, which include nonindustrial timber harvesting and timber that was administratively withdrawn from timber production during the year.

A second estimate of timber removals was developed from the remeasurement of permanent sample plots. These current annual removals (Tables 21 and 22) are used for making growth and removal trend comparisons and are considered more accurate for assessing the changes in the timber inventory since 1961.

Data for timber products were gathered during a complete canvass of primary wood manufacturers that operated in West Virginia in 1974. Utilization studies were conducted concurrent with logging operations withing the State. Data from these sources, and from regionwide production surveys that are conducted annually, were used to analyze the 1974 timber harvest and output of timber products.

The production of timber products from all sources totaled 136 million cubic feet in 1974. This volume represented a 5 percent increase in total output from the 130 million cubic feet reported in 1960. Sources of the 1974 timber-products output and their volumes are:

	Million cubic feet	*Percent*
Growing-stock volume:		
Softwoods	8.2	6
Hardwoods	91.3	67
Total	99.5	73
Other volume	10.2	8
Total roundwood	109.7	81
Plant byproduct volume	26.5	19
Total output	136.2	100

Other sources in the above tabulation include utilized volume from trees less than 5.0 inches in diameter, tree tops and limbs from commercial forest areas, and any material from noncommercial forest land or nonforest land such as fence rows and suburban areas.

Softwoods made up 10 percent of the total output volume and 11 percent of the roundwood output (11.8 million cubic feet). Hardwoods made up 90 percent of the total output volume and 89 percent of the roundwood output (97.9 million cubic feet). Compared to 1960, softwood output from roundwood increased by almost 25 percent while the corresponding hardwood output decreased by 1 percent.

Changes in roundwood production between 1960 and 1974 by products and species groups are very pronounced. Total sawlog volume increased 23 percent to 72.2 million cubic feet, aided by a 34 percent increase in softwood sawlog production. Roundwood production for pulpwood decreased about 8 percent to 18.2 million cubic feet. Although softwood pulpwood production decreased abut 38 percent, hardwood production increased about 9 percent. Veneer, cooperage, and posts were the only other timber products that increased in volume, but together they made up less than 3 percent of the total roundwood production in 1974. The changes in industrial roundwood production are shown in greater detail in the report, *The Timber Industries of West Virginia* (Bones and Glover 1977). The 1974 roundwood production in West Virginia from all sources and by products is:

	Million cubic feet	*Percent*
Sawlogs	72.2	66
Veneer logs	.5	[a]
Pulpwood	18.2	17
Cooperage logs	.5	[a]
Posts	2.1	2
Mine timbers	6.7	6
Other industrial	6.5	6
Fuelwood	3.0	3
Total	109.7	100

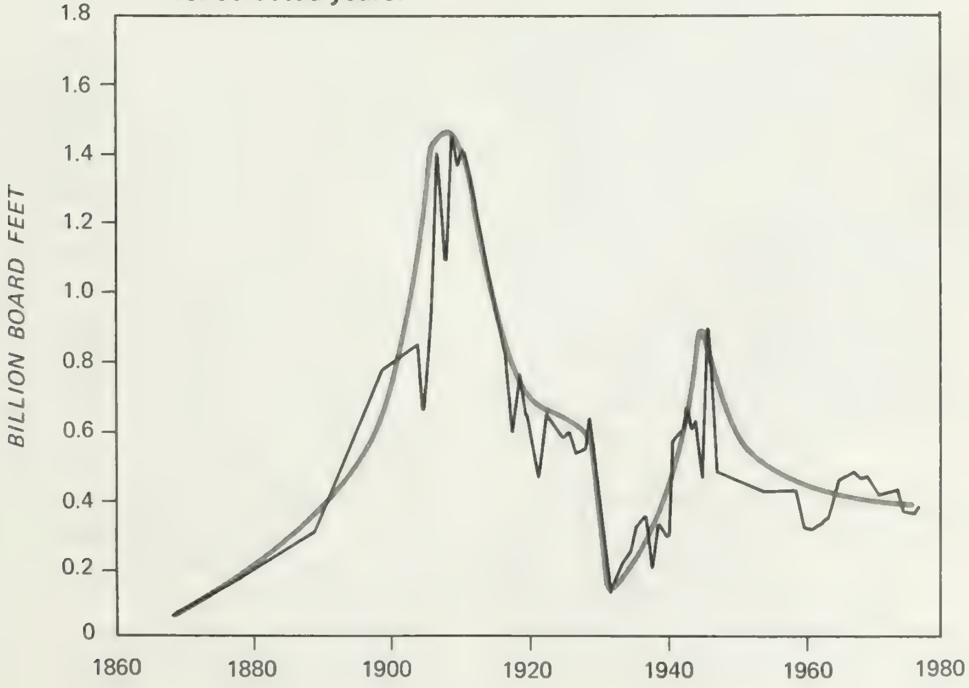
[a] Less than 0.5 percent.

Lumber and sawlog production declined

Historically, lumber production in West Virginia has fluctuated widely (Fig. 8). The earliest records (Steer 1948) show that production was 76 million board feet in 1869. Forty years later in 1909, lumber production reached a record high of nearly 1.5 billion board feet. The 537 million board feet of softwood production represented 38 percent of the total. By 1932, production had dropped to 135 million board feet, but World War II spurned production to 891 million board feet in 1946. Since the war, production has dropped to between 350 and 450 million board feet of lumber annually. Lumber production was 381 million board feet in 1974; 5 percent of the total was from softwoods.

The number of active sawmills in West Virginia and sawlog production and receipts have all declined in the past decade. There were 505 sawmills in 1965 that received 485 million board feet of sawlogs. In 1974, 365 sawmills received 447 million board feet of sawlogs. Sawlog production declined from 491 million board feet in 1965 to 464 million in 1974.

Figure 8.—Lumber production in West Virginia for selected years.



Even though the trends are down, unit productivity of West Virginia sawmills has been increasing. Average sawlog receipts per sawmill rose from about 950 thousand board feet in 1965 to 1.2 million board feet in 1974. The decrease in sawlog production and receipts was not uniform throughout the State. In fact, sawlog production in the Northwestern Unit rose 26 percent and receipts rose 17 percent between 1965 and 1974. Sawlog production and receipts declined more in the Southern Unit (the State's largest producing region) than in the Northeastern Unit.

Round pulpwood production down; residue chip production up

Pulpwood from roundwood (213.6 thousand cords) made up nearly 52 percent of the total pulpwood production in 1974. In 1960, when roundwood made up 100 percent of the harvest, 246 thousand cords were produced. So, although total pulpwood production rose by two-thirds to 412 thousand cords between 1960 and 1974, the roundwood harvest for pulpwood declined more than 13 percent. During the same period the softwood portion of the pulpwood harvest declined from more than one-third of the total in 1960 to less than one-fourth in 1974.

The use of chipped manufacturing residues has grown dramatically in the past decade. The 92 thousand cord equivalents recovered in 1965 represented 22 percent of the production total. In 1974, the 199 thousand cords that were recovered represented 48 percent of the total. As chipped-residue recovery increased over the years, the roundwood harvest for pulpwood decreased.

Total-tree harvesting systems are being employed in many of the hardwood areas of the Appalachian Region. With the cost of skilled labor and raw material (wood) going up, total-tree harvesters are an attractive alternative to conventional harvesting equipment. Three harvesters were operating in West Virginia in 1974. The 7.3 thousand cord-equivalents of chips that they produced represented about 3 percent of the total pulpwood harvest.

Thirty-eight percent of the pulpwood that was harvested from softwood species in 1974 came from three counties: Hampshire (5.6 thousand cords), Morgan (7.0 thousand cords), and Wirt (6.7 thousand cords). Greenbrier County was responsible for nearly one-fourth of the total harvest (53.1 thousand cords).

No pulpmills were located in West Virginia in 1974, so the total production was shipped to other states. Nine pulpmills in four states received pulpwood from West Virginia during the year. Most of the pulpmills produce bleached Kraft pulp.

Most other products come from hardwoods

Veneer and cooperage logs and bolts, posts, mine timbers, fuelwood, and miscellaneous products (total of 19.3 million cubic feet) accounted for 18 percent of the timber products output from roundwood in 1974. These products (30.1 million cubic feet) made up 28 percent of the roundwood output in 1960.

The 1974 outputs of roundwood volume for these other products—in cubic feet and percent—and percent from hardwood species are:

	Million cubic feet	*Percent*	*Percent hardwood*
Veneer logs	0.5	3	100
Cooperage logs	.5	3	100
Posts	2.1	10	91
Mine timbers	6.7	35	92
Fuelwood	3.0	15	95
Miscellaneous	6.5	34	42
Total	19.3	100	76

Veneer and cooperage log production has been decreasing; raw material for these products comes from high-quality, old-growth stands. Cooperage log demand has declined because white oak whisky barrel demand is down. Species preferences for veneer logs have become less pronounced recently as industry has developed ways of using a greater variety of species. In 1963, yellow-poplar accounted for 69 percent of the total veneer log harvest in West Virginia. In 1974, although it was still the most favored species, yellow-poplar accounted for 35 percent of the harvest.

Round and split mine timber production is directly related to the volume of coal that is produced in underground coal mines. Since coal production was less in 1974 than in 1960, production of mine timbers decreased.

Softwood fence rails made up a large portion of the miscellaneous products production in 1974; therefore the percentage of hardwoods was lower in the miscellaneous category (42 percent) than in any of the other product categories

TIMBER SUPPLY OUTLOOK

The substantial increase in the area of commercial forest land since 1949, a 90 percent volume increase in the growing stock inventory, and the fact that timber removals in 1974 were only 35 percent of annual net growth are all positive signs and indicate that opportunities for forest industry expansion exist within the State. A comparison of unit and species statistics, however, show that these favorable indicators are not evenly distributed between geographic units and species. These imbalances will be discussed in coming portions of this section.

Thirty years from now

History provides valuable insights for predicting future trends. Since we have 25 years of observations about past inventory, growth, and removals levels for West Virginia, one approach to predicting future levels is to assume that the current inventory and growth trends will remain constant. Since removals in the past decade have been atypical, an accelerated rate was assumed. Other underlying assumptions include: (1) total area of commercial forest land will increase approximately 300,000 acres in each decade for the next 30 years; (2) average annual net growth rates for 1959 through 1974 will continue for the next 30 years; (3) and there will be no major increase in the level of forest management or timber utilization during the next 30 years.

Predictions, based on these assumptions, of growing-stock growth, removals, and inventory levels for softwoods are considerably different from those for hardwoods. The hardwood growing-stock inventory will increase from less than 13 billion cubic feet in 1975 to about 23 billion cubic feet in 2005, an 85 percent change. The softwood inventory, however, will increase 210 percent, from less than a billion cubic feet to 3.1 billion cubic feet. Higher growth rates and lower removal rates both contribute to the inventory gain for softwoods. The projected average annual growth rate of 3.9 percent for softwoods is 20 percent higher than that of hardwoods. Current annual removals equal 18 percent of growth for softwoods, compared to 37 percent for hardwoods.

The overall assessment shown in Figure 9 looks bright. Average volume of growing stock on commercial forest land is expected to increase from the present 1,177 cubic feet per acre to nearly 2,000 cubic feet per acre in 2005, even though the forest base is expected to increase by 900,000 acres with the inclusion of low-volume regenerating stands that are currently classified as pasturelands. As in so many cases, however, the aggregate projection tends to mask underlying problems.

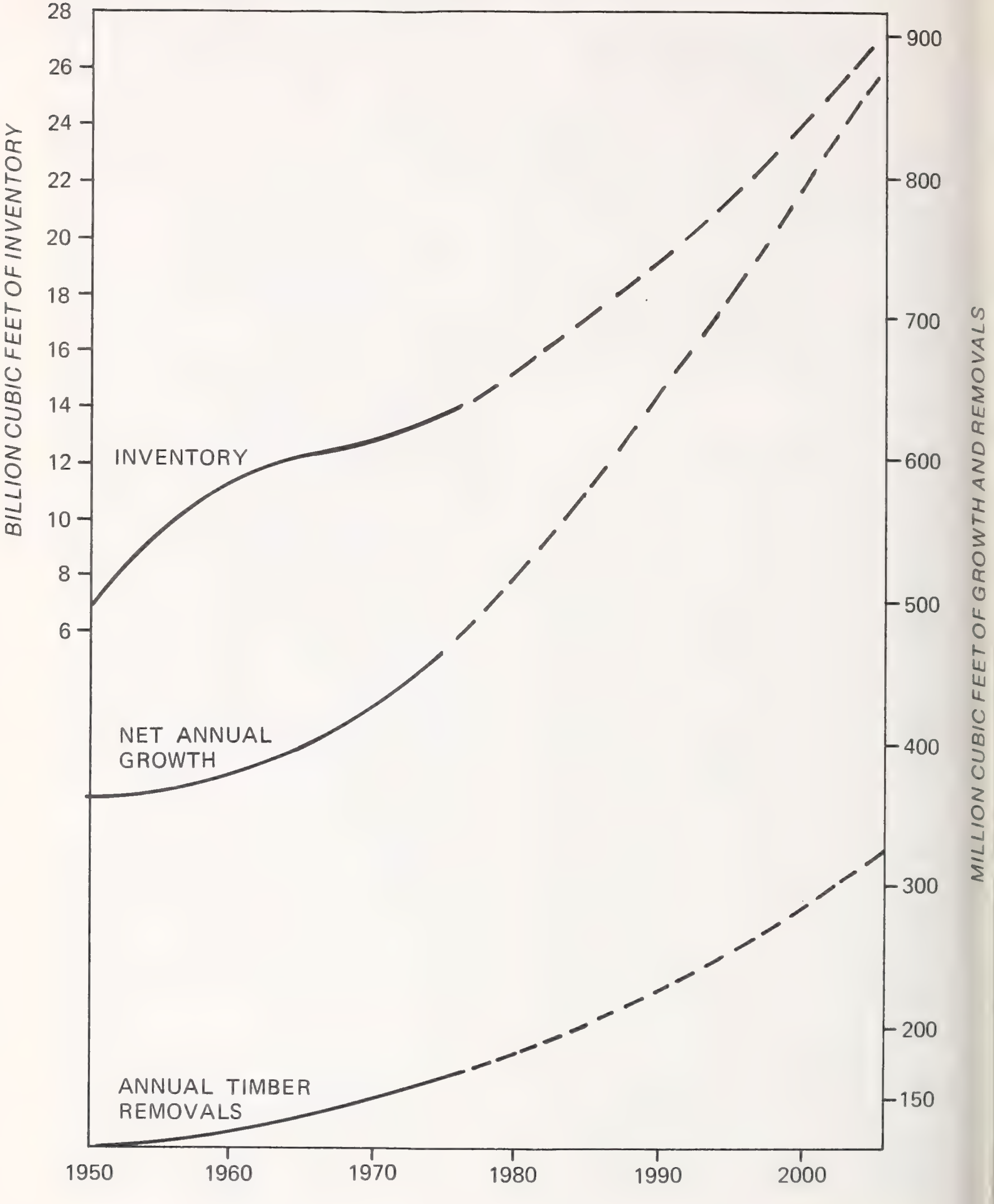
Since more than two-thirds of the industrial roundwood output in 1974 was used for such products as lumber, cooperage, and veneer, high-quality, large-diameter hardwood trees were in great demand. Sawtimber removals actually exceeded growth for sugar maple, beech, and hickory. Overcutting of these species was offset by growth of the select white and red oaks, yellow-poplar, and red maple. Since much of the sawtimber volume of yellow-poplar and the oaks is found in young trees less than 18 inches in diameter, high-quality logs are scarce.

Annual growth per acre will increase from 41 cubic feet per acre at present to about 70 cubic feet per acre in 2005 unless there is an increase in the level of timber management. The growth rate for these sites, even at the 2005 level, is much below their theoretical potential. About 83 percent of the commercial forest land in West Virginia is theoretically capable of producing more than 50 cubic feet per year, and 42 percent is capable of growing 85 cubic feet or more per acre per year.

Why is the per-acre growth so far below its potential? The answer relates to the type of trees that are occupying the growing space. This is particularly true for the hardwood stands that make up most of the commercial forest area. At times in the past, the best quality timber was removed for high-value products. As a result, many of the hardwood stands contain large numbers of poor-quality trees. Nearly a quarter of all the hardwood trees at present are either highly defective or have poor form.

By examining stocking levels by stand component, it is possible to determine the role of non-growing-stock trees in reducing growth. When all live trees are considered, 25 percent of the commercial forest land is overstocked. But, for growing-stock trees only, this percentage drops to 2 percent. By definition, overstocked means that

Figure 9.—Projection of inventory, growth, and removals in West Virginia to 2005.



there are too many stems per acre to permit maximum growth. Therefore, if the non-growing-stock component could be reduced in these timber stands, they could be made to produce at a higher rate.

Harvesting the growth

Statewide, the main source of the timber harvest has shifted during the past two decades from public to private lands and from farmer and mostly small individual ownerships to forest industry and large corporate ownerships. During the 1950's about 14 percent of the timber harvest came from public timberlands and only 1 percent came from forest industry lands. During the 1960's less than 10 percent of the growing-stock harvest came from public lands and about 16 percent of the sawtimber harvest came from forest industry lands. Ownership of the private lands has been shifting over the past 20 years from farmers to individuals and from corporate to forest industry ownership. Many of the family farms have been subdivided and purchased by individuals with diverse occupations. Many of the new owners reside in the metropolitan centers of neighboring states. These individuals now control 5 million acres of the commercial forest lands, or 42 percent of the total.

Harvesting levels as a percentage of growth differ among the State's three geographic regions. Although the annual growth is greatest in the Northesastern Unit, only 33 percent of the 200 million cubic feet of growing-stock growth and 38 percent of the 374 million board feet of sawtimber growth is being harvested. By contrast, in the Southern Unit, current removals equal 57 percent of the growing-stock growth (135 million cubic feet) and 106 percent of the sawtimber growth (207 million board feet). Many factors affect the amount of timber harvested during any one year, but ultimately the harvest-nonharvest decision rests with the forest- land owner. The Northeastern Unit has the highest percentage of public land ownership in the State yet only a third of the growth is being harvested. The Southern Unit has the highest percentage of forest industry and other large corporate ownership and the highest harvest-to-growth ratio.

The private forest-land owner's willingness to harvest timber from his land was assessed during the resurvey (Birch 1977). Fifty-three percent of the individual forest-land owners (who control 26 percent of the 4.8 million acres of commercial forest land) said that they never intended to harvest timber from their land. Conversely, only 7 percent of the individual landowners (who control 17 percent of the commercial forest land) indicated a positive inclination for harvesting timber.

A summary of the current distribution of the State's commercial forest land by classes of forest-land owners, acreage of commercial forest owned, and the acreage owned by those who intend to harvest timber are:

ACREAGE OF COMMERCIAL FOREST LAND
(Million acres)

Class of owner	*Total*	*Plan to harvest*
Public	1.1	[a]
Farmer	1.9	.5
Forest industry	.9	.8
Corporate	1.8	1.3
Individual	4.8	.8
Other	1.0	.3
Total	11.5	3.7

[a] Previously restricted; harvesting currently resumed.

If current attitudes persist, only a third (3.7 million acres) of the commercial forest land in West Virginia will be available for timber harvesting. The major source of timber will be forest industry and other corporate forest lands. Certainly any future expansion of local timber industries will depend upon industry's ability to convince individual landowners to manage and utilize the timber that they control.

Public land management strategies have also been altered during the last decade in response to the public's desire for a redirection of land-use priorities. Although timber management will always be a high priority resource use for public commercial timberlands, West Virginia residents are also deeply concerned with protecting the recreation, watershed, and visual values on public lands. As time passes, tradeoffs are certain to occur; for example, the very access that is so essential for intensive timber management will detract for wilderness-type, dispersed recreation experiences.

A federal court order in 1973 curtailed timber sales over a 4-year period on national forest lands in West Virginia. Based upon a strict interpretation of the Forest Service Organic Act of 1897, the court order ruled that only dead, matured, and large trees could be sold, that the timber must be marked and designated before cutting, and that trees must be cut and removed under Federal supervision. Forest managers believed that by imposing these restrictions the court made it impossible to use harvesting as a means toward good silviculture. The controversy was settled when the National Forest Management Act of 1976 was signed into law by President Ford on October 22, 1976. In addition to correcting the wording about timber sales in the 1897 legislation, it provided broad policy direction for the entire National Forest System including the national forests of West Virginia.

Inventory versus timber supply

Timber supply can be defined as the net utilizable roundwood volume removed from the forest, and may include wood from live, sound (growing stock) trees or from dead and cull trees. Not all of the tree volume included in the timber inventory is harvested and converted into timber products, and conversely, not all of the timber harvested for products is included in the inventory. Timber recovery depends mostly on such variables as the state of the economy, consumer preferences, the location and accessibility of timber, the condition of the timber stand, and the products that will be made from the timber. The timber supply may differ for different product alternatives and may be greater or less than the growing-stock inventory.

From utilization studies, we were able to determine current utilization levels for the major timber products. For example, we found that when sawlogs are harvested from a typical hardwood stand, approximately 70 percent of the total growing-stock removals (inventory volume) is recovered for lumber products. The remaining 30 percent is left at the harvest site as logging residue. This residue consists mostly of growing-stock trees that were destroyed during harvesting or tree sections from which the entire merchantable bole was not recovered. In addition to the growing-stock volume that is recovered for products, a volume of sawlogs equivalent to 21 percent of the total harvest (supply volume) was recovered from such non-growing-stock sources as tree tops and dead and cull trees. We also found that multiproduct harvesting in West Virginia hardwoods can increase product yield by 24 percent over single-product sawlog harvesting; a 3 percent increase in product recovery from growing stock (inventory) and 21 percent increase from non-growing-stock sources.

Conventional logging practices are giving way to new and innovative practices that promise to increase the timber product recovery significantly; especially in the hardwood stands now being harvested for pulpwood and other fiber products. A local researcher [1] reports that per-acre wood fiber yields might be increased 20 to 60 percent by total-tree harvesting in West Virginia. Total-tree harvesting means that the above-ground portions (excluding the stump) of all trees 2 inches dbh and larger are chipped, including the bark. In 1974, the three total-tree harvesters that operated in West Virginia produced about 7,300 cord-equivalents of pulp chips.

OTHER NATURAL RESOURCES

The land—its use and management

Since the land area is fixed and population density is increasing in West Virginia, the available land must be managed more intensively. Only by establishing land-use priorities based on public demand can the resources be equitably allocated.

Often user groups find themselves competing for exclusive use of the same land; and when the uses are not compatible, conflicts result. Resource managers at all levels should be active participants in land-use planning at an early stage and where possible, should resolve local conflicts before public opinion has polarized and emotion has affected the decision-making process.

Probably the most critical variable in the natural resource allocation equation is the human factor. Land administrators or owners are responsible for making the final decisions on resource uses. While public land managers have the difficult task of correctly assessing the ever-changing moods of the people, individual private landowners often lack the expertise and technical knowledge needed to make sound land management decisions. But owner attitudes, along with such factors as location and the physical attributes of the land, will determine future use levels of renewable resources.

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[1] Personal correspondence from B. B. Brenneman, Research Forester, Westvaco, Rupert, West Virginia.

Public lands. About 1.3 million acres of land in West Virginia are administered by public agencies. Nearly a million acres are in national forests, mostly located in the Appalachian Highlands. The location and extent of the Forest Service land will probably cause it to dominate future resource-use decisions in the region, but at the same time restrict the uses that the public is willing to accept for the land. Future management priorities will probably be based more on political considerations than economic ones.

Water. The headwaters of both the Ohio and Potomac River systems are located in the national forests, and these lands are an important source of pure surface water. One high-priority objective of national forest managers is to maintain and enhance water quality and to regulate flow. Resource uses that jeopardize water quality or upset flow patterns are to be avoided.

Over 70 percent of the cold water fish habitat in West Virginia is inside the national forest boundaries (U.S. Forest Service 1975a). In addition, some 351 miles of warm water streams and nine fishing impoundments (totaling 274 acres) are located in national forests. Trout is a highly regarded game fish. Fishermen spent 894,000 man-days (43 percent of their total angling time) fishing for trout in 1970. State harvest records (West Virginia Dept. Natural Resources 1973) show that about half of the trout caught each year are taken within the national forest boundaries. Cold water angling on the Monongahela National Forest alone is projected to grow from 195,800 visitor days in 1973 to 250,000 visitor days in 1985.

Outdoor recreation. Over 10 million people live within 150 miles of the public lands that are concentrated in the Appalachian Highlands. Public lands are the primary source of dispersed and primitive-type outdoor recreation available to this growing population. For this reason, some of this land has been formally classed as national recreation or wilderness areas and other land may later be reclassified to these uses. Of the 1.2 million visitor days spent on national forest lands in 1973, over half were spent pursuing such dispersed activities as camping, hunting, hiking, rock climbing, and bird watching (U.S. Forest Service 1975a). Forest Service managers estimate that dispersed outdoor recreation will increase to more than 1 million visitor days annually by 1985 and 2.5 million visitor days by the year 2000.

Most public lands are forested with maturing timber stands that are well suited to black bear, snowshoe rabbits, turkeys, and crown-nesting birds. Bears and turkeys require more isolation to thrive than the so called "edge species" and are compatible with other dispersed recreation use. Over 80 percent of the bear and snowshoe rabbit harvest came from public lands in 1974.

Private land. The 14.1 million acres of privately owned land comprises about 92 percent of the total land area. These private lands contain 10.3 million acres of commercial forest land which currently supports about 11.3 billion cubic feet of growing-stock volume, including 22.9 billion board feet of sawtimber. The size of private holdings varies greatly as do owner attitudes toward using and managing their land. The following tabulation shows the distribution of West Virginia's 207,500 private landowners and the commercial forest land acreage they own by classes of ownership (in percent):

Class	*Owners*	*Acreage*
Corporate	1	17
Forest industry	[a]	8
Farmer	21	19
Individual	69	46
Other	9	10
Total	100	100

[a] Less than 0.5 percent.

The 143,000 individual forest-land owners control 42 percent of the commercial forest land, but since the control of these lands is so highly diffused, uniform management will be difficult. Corporate owners (including forest industry) however, are better organized for efficient timber management; they represent 1 percent of the total landowners and control 25 percent of the commercial forest land.

When timber harvesting was restricted on public lands, local timber-product manufacturers shifted to private lands for their raw material. The net growth from the 879,700 acres of timberlands owned by forest industry is already being harvested. Therefore, any increase in the level of harvesting will result in depleting the overall timber supply on these lands. Non-forest-industry corporations own about 1.8 million acres of commercial forest land. Even though timber is not their primary interest, 11 percent of these corporations (which control 76 percent of the industrial commercial forest acreage) indicated in a recent survey (Birch 1977) that they intend to harvest timber in the next decade.

Without the support of the 143,400 individual private landowners (who control 4.8 million acres of West Virginia's commercial forest land) future timber-related industrial expansion of any significance will be impossible. Currently, wide support for timber harvesting is lacking. Only 7 percent of the individual owners who control 17 percent of the total acreage said they plan to harvest timber during the next decade. Conversely, 53 percent of the owners who control 26 percent of the acreage said that they will never harvest timber. Therefore, not only a neutral attitude, but a negative attitude toward harvesting must be overcome before this ownership group will consider harvesting timber.

Outdoor recreation. A major problem in meeting the demands for small game hunting and warm-water angling is providing access to the privately owned lands. When asked, less than half of the individual private landowners indicated that they would permit small game hunting or fishing. The most likely approach to ensure that these wildlife populations are maintained and available to hunters and anglers may be to provide economic incentives for the landowners.

Mineral extraction. Strip mining was carried out for iron ore between 1822 and 1866. Natural revegetation has now completely blanketed the spoil areas and mature yellow-poplar and oaks predominate.

Strip mining for coal in West Virginia began around 1917 but substantial activity did not develop until 1940. By 1950 about 70,000 acres of coal had been stripped and about 2,000 acres were being added annually (Core 1966). The unsightly spoils are unassorted, where fine rock particles were mixed with huge rock fragments and slabs. Usually the top soil was buried. Natural vegetation on these areas proceeded very slowly. Since 1945, however, regrading and planting and seeding have been required by law in West Virginia. A recent Stanford Research Institute study (W. Va. Office of Federal-State Relations 1975) estimated that approximately 247,824 acres of land have been disturbed by surface coal mining, and local mining officials estimate that more than 15,000 acres of surface coal is being stripped annually.

Although the primary purpose of revegetating these areas is to stabilize them and protect them from erosion, good timber and wildlife production can be realized. On favorable sites, tree plantations managed for timber production can produce poletimber-size trees in 25 years and small

Rehabilitation is an essential final step in any strip mining venture. The unsightly spoils are highly visible during stripping (left photo). If the revegetation and stabilization programs are successful, old spoils can be both visually pleasing and productive (right photo).

sawtimber in 35 years. Researchers (Davis and Davidson 1968) report that pines and other conifers do particularly well on acid spoils. Areas developed for wildlife production include small water impoundments and the cultivation of food strips, with plantings or grasses, legumes, and shrubs. Coal-haul roads constructed during mining operations open up large areas that were previously inaccessible to hunters. Although sediment and chemical pollutants associated with strip mining are often harmful to the fish and other aquatic life in streams draining mined areas, there are situations where the water can be successfully impounded and restocked with resistant warm water fish species (Baumgardner and Steiner 1974).

Water supply is adequate; quality is a continuing problem

Precipitation for most of West Virginia is adequate and fairly well distributed over the State throughout the year. Average annual precipitation is about 43 inches, approximately 8 percent falling as snow. The high mountain areas of the Appalachian Plateau get as much as 65 to 70 inches of precipitation annually, while some valleys immediately east of the Allegheny Front receive as little as 31 inches.

In the typical forest, approximately 6 inches of the 43-inch rainfall is intercepted by vegetation before it reaches the soil and is either evaporated or transpired back into the atmosphere. The remaining precipitation soaks through the litter into the underlying soil. About 18 inches of this soil water is absorbed by tree roots and evaporated through the leaves.

The remaining 19 inches of the annual precipitation, collected on the approximately 24,080 square miles of drainage area in the State, is discharged through 32 major stream systems.[2] These streams are a major source of domestic water, supply water for industrial complexes, and provide hundreds of miles of cheap transportation and hydroelectric power for West Virginia residents and industry.

Water use has been substantial in recent years—over 6 million gallons per day. While surface water withdrawals account for over 95 percent of the total use, ground water is the most important source of public water supply systems. The alluvial deposits of the Ohio Valley provide West Virginia's most productive aquifer. Smaller supplies of underground water are found in the Kanawha and Monongahela Valley alluviums. A number of public water systems, primarily in the southern coal fields, use mine waters as their source of supply.

The major limestone deposits of the eastern panhandle and the counties that form the southeast boundary with Virginia have abundant groundwater springs. There are more than 200 major springs in this area that yield at least 100 gallons or more of water per minute. Big Springs, in Grant County, has yielded as much as 269,000 gallons per minute.

The quantity of water available for use is of little concern since the supply is many times greater than the present use. This does not mean that good water management should not be practiced, however, since poor management leads to water quality deterioration and uneven runoff when soil is exposed. Even under normal conditions, average streamflow is much greater in the winter and early spring than in the summer and fall. Massive earth disturbances in a watershed can upset the natural regime of streamflow, producing interrupted flow in the summer and floods that cause accelerated erosion and stream sedimentation in the winter (Kochenderfer and Patric 1970).

Water quantity and quality problems are often related. When streamflow is low, pollution levels are high, because less water is available to dilute the pollutants. A stream that is rated clean at normal levels may become an open sewer at low flow levels when it still carries the same volume of polluting material.

To combat today's water-related problems and to assure an adequate future supply, effective water management is necessary. This will require accelerated conservation and protection activities, continued pollution reduction, devising of better techniques for processing and reusing the available water, and development of an effective program for allocating the available water among competing uses.

Well-managed, productive forests protect, regulate, and improve the supplies of available water. Even when timber stands are harvested, sediment buildup in most forest streams is tolerable and only temporary (Lull 1971). Sediment levels in eastern hardwood forests may increase from 0.02 ton per acre annually to 0.04 to 0.50 ton per acre during harvesting, but will return to preharvest levels within 2 years after logging if normal erosion control guidelines are followed. By contrast, erosion of from 1 to 5 tons per acre per year is recognized as tolerable for agricultural land (Patric 1977).

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[2] Personal correspondence from C. A. Troendle, Research Hydrologist, U.S. Forest Service, Parsons, W. Va.

Outdoor recreation increasing in importance

The need for recreation is inherent in man and the list of his recreational pursuits is endless. A continuing chess game at coffee breaks, an afternoon of golfing or fishing, or a week of backpacking in a wilderness all are within the spectrum of activities that afford man an opportunity to "recreate" himself.

Because recreation activities are so diverse, many levels of government and private enterprise become involved in planning for them. The need for recreation in West Virginia and the acceptance of government involvement in it affects all 55 county governments, 226 municipalities, at least 12 state and numerous Federal agencies. The private sector fills in the gaps, especially in the field of tourism. The travel industry alone, including private enterprise, had direct sales within the State of about 540 million dollars in 1972 and provided direct employment for some 42,000 West Virginians (W. Va. Office of Federal-State Relations 1975).

Most recreation is either activity-based or resource-based. Activity-based recreation is characterized by high development costs, while resource-based recreation requires a minimum of development. Activity-based facilities such as playgrounds, tennis courts, and baseball diamonds require less acreage for development, while resource-based recreation requires large acreages and a natural setting. Resource-based recreation is directly related to the forest land base and its use.

Certain areas within West Virginia are remnants of the original undisturbed landscape, or have unique natural features or are of historic value. Not only do many of these areas furnish unique recreation experiences for the State's residents, but they are also of national significance. Heavy demands upon West Virginia resources for recreation also come from the more urban neighboring states. Consequently, many of the natural areas assume a regional significance.

Resource-based outdoor recreation experiences are especially treasured by urban residents (Courtesy of Wonderful West Virginia Magazine).

To determine the demand for such areas, one must first identify what resources are available and the motives or pressures for their utilization. Success in fulfilling the demand for resource-based recreation cannot be measured solely in terms of public use, since overuse of these areas often results in major management problems that require restriction on control of public access. Determining optimum levels of use will be a continuing problem for outdoor recreation managers.

Management of the resource-based recreation areas of West Virginia was until recently divided between several State and Federal agencies. On February 13, 1975, the Governor created by executive order a Heritage Trust Advisory Commission whose goal is to identify and protect those areas (natural, recreation, and historic) that have great intrinsic value and are in need of special consideration. The first phase of this program will be to inventory those natural, recreation, and historic sites that have statewide or national significance. After the cataloging is complete, the inventory will be compared to estimates of current and projected demand.

Most of the resource-based outdoor recreation in West Virginia is on public lands. Over a million acres are administered by Federal agencies and another one-quarter million acres by State agencies. Ninety-two percent of this land—1.3 million acres—is classed as natural environmental land and is located in national or state forests and parks. The national forests are managed under multiple-use and sustained-yield principles. Recreation resource values are identified and managed in harmony with other resource values. In a like manner, the West Virginia Division of Forestry manages the state forests for a variety of uses, the Division of Parks and Recreation administers a system of recreation parks for general recreation, and the Wildlife Division manages the wildlife resource areas for public hunting and fishing. The parks and wildlife areas were acquired specifically for recreation purposes and to ensure the preservation of natural environmental areas.

Federal and State agencies have also identified approximately 100,000 acres that are considered to have unique scenic, historic, or cultural value, or are primitive in nature. These areas must be preserved and protected in their natural state since they are considered of national importance. Some of these areas have been formally designated as Registered National Landmarks under Public Law 74-292 or classified as Wilderness Areas under Public Law 93-622. Currently West Virginia has two Wilderness Areas ; Otter Creek, 20,000 acres in size, and Dolly Sods, 10,250 acres in size. A third area in Webster and Pocahontas counties, the Cranberry Back Country (36,300 acres) is being considered for inclusion in the national wilderness system. The major national historic landmark in West Virginia is the Harpers Ferry National Park. Visitors come from all over the world to visit this place that is rich in Civil War history. The State has several major cultural and historic parks that preserve locations of importance to West Virginians. The Cass Scenic Railroad and Droop Mountain Battlefield State Park in Pocahontas County, the Carnifex Ferry Battlefield State Park in Nicholas County, and the Watters Smith Memorial State Park in Harrison County are important ties to the State's heritage.

Although studies conclude that the current outdoor recreation requirements of certain segments of the West Virginia population are not being met, overall the total recreation resource is adequate (W. Va. Office of Federal-State Relations 1975). Activity-based recreation, which is directly related to people, their density and interests, needs to be expanded in places where population density is increasing and in rural areas where few facilities currently exist. Many of the shortages in outdoor recreation facilities can be traced to poor distribution because of recent population shifts. In these cases, interim measures can be initiated. These might include making more efficient use of existing facilities by making them available at night or extending their present seasons of use. Another example would be the use of school facilities for adult recreation. Schools could be especially valuable for such uses as crafts programs for the handicapped or aged. Libraries, religious facilities, and other public buildings are often under-utilized, and in many cases, they are already equipped with ramps and handrails for the handicapped.

Recreation planners should encourage recreation development as an integral part of future public works projects and private developments within the State. River basin and highway development projects that are currently in the planning stages will provide excellent opportunities for incorporating such facilities as picnic tables, boat ramps, beaches, and scenic observation points and information facilities.

State outdoor recreation planners estimate that out-of-state residents account for 35 percent of the total annual recreation use. These nonresidents come to escape the urban areas in which they live or are travelers enroute to other places. Although these tourists use accessible activity-based recreation facilities, they are mostly drawn by the rural setting and resource-based outdoor recreation areas.

West Virginia is fortunate to have more federally administered resource-based outdoor recreation land than any other state in the Northeast (W. Va. Office of Federal-State Relations 1975). As construction of the Federal highway system is completed, more outdoor recreationists from neighboring urban states will seek out these resource-rich recreation lands to ''get away from it all''.

Wildlife resource is varied

The climate, topography, and geology of an area influence the composition of the plant community, and the nature and abundance of the local vegetation, in turn, influence the kinds of wildlife that an area can support. West Virginia is unique among the eastern states. The State is the meeting ground for typically northern and southern flora and fauna and thus provides a wider variety of plant and animal life than most other states. The Allegheny Mountains which bisect the State are covered with the northern hardwood and spruce-fir forests that are characteristic of the forests further north. The eastern slopes of these mountains are predominatly oak-pine and the western slopes and lower elevations are dominated by the oak-hickory forests typical of the central hardwood region.

Past human influences. As man made his imprint on the landscape certain environmental changes occurred which radically affected the compositon of the wildlife population. Thus, as West Virginia was transformed from a wilderness to its present state there have been significant changes in the composition and abundance of the native wildlife. The bison, eastern cougar, river otter, elk, wolf, passenger pigeon, and sturgeon, once indigenous to West Virginia, have been extirpated (W. Va. Dep. Natural Resources 1974). Few of these native wildlife species were purposely exterminated by man. Most were victims of habitat destruction by land filling and clearing, siltation and pollution, wildfires and erosion, and other massive man-made environmental changes.

Most fish and wildlife are sensitive to environment change. As mature forests are cleared, natural watercourses changed, wetlands drained, and streamflows and temperatures altered the quantity and quality of the food, water, and cover for the native fish and wildlife are immediately affected. Some man-made changes may be beneficial to wildlife. Opening up the native vegetation as the State was settled, providing a good balance of mature forests, regenerating forests, and open spaces, increased the food supply and encouraged ever-increasing populations of such ''edge'' species as deer, grouse, and cottontail rabbits (U.S. Forest Service 1970). The deer population in West Virginia in the early 1900's was estimated at about 1,000 animals. The white-tailed deer harvested by gun alone in 1974 numbered nearly 24,000. In addition, over 2,000 deer were harvested during bow-hunting season and 4,000 were known to have been killed illegally or accidently.

The populations of certain ''interior species'', such as gray squirrels, turkeys, and snowshoe hares, have been reduced over the years as the mature timber stands of the State were converted. A striking example of population reduction that resulted from habitat reduction is that of the snowshoe hare, whose range is limited to the spruce-fir type about 3,000 feet elevation in the Allegheny Mountains. Originally this forest type occupied 469,000 acres of West Virginia high country (Core 1966). Over the years its extent has been drastically reduced, first by clearcutting and later by repeated burning, until today it covers less than 60,000 acres.

Wildlife resource requirements. The maintenance and perpetuation of the wildlife resource is important to most West Virginians. Many rural residents consider hunting and fishing an essential part of the agricultural harvest and the major form of recreation available to them. Urban dwellers value the closeness of good hunting and fishing. They spend a sizeable portion of their discretionary income each year on hunting and fishing licenses and equipment.

The following statistics present the past and expected future growth in number of resident and nonresident licensed hunters and fishermen in West Virginia:

Year	Hunters			Fishermen		
	Resident	Nonresident	Total	Resident	Nonresident	Total
			(Thousands of licensees)			
1960	211.6	7.9	219.5	148.9	9.0	157.9
1965	224.1	13.0	237.1	187.8	22.6	210.4
1970	234.2	22.8	257.0	219.2	33.4	252.6
1973	232.6	25.9	258.5	222.5	23.3	245.8
1980[a]	239.0	30.0	269.0	230.0	34.0	264.0
1990[a]	244.0	36.0	280.0	241.0	40.0	281.0
2000[a]	252.0	44.0	296.0	256.0	48.0	304.0

[a] Estimates based on past trends.

Source: 1960-1973 Statistics; West Virginia Div. of Wildlife Resources.

Demand for wildlife resources has been growing over the years. Resident hunting and fishing license sales increased 11 percent and 47 percent respectively from 1960 to 1970. More important, however, is the increase in nonresident license sales. The 7,900 hunting licenses that were purchased by nonresidents in 1960 represented less than 4 percent of total sales. In 1973, the 25,900 nonresident hunting licenses purchased represented more than 10 percent of total sales. If these trends continue, an estimated 296,000 hunting licenses and 304,000 fishing licenses will be purchased by the year 2000. About 15 percent of the total will be purchased by nonresidents.

A hunting use survey in 1970 (Riffe 1971) indicated the type of forest game animals that hunters preferred to hunt. Most popular among the respondents were squirrels, followed by deer, ruffed grouse, wild turkey, raccoon, bear, woodcock, and snowshoe hare. In addition, cottontail rabbits are a highly regarded game animal on agricultural land. Trout is the most popular forest-game fish.

These preferences are supported by 1970 statistics (West Virginia Dept. Natural Resources, 1974) that show the number of licensed hunters that hunted these game species and the number of days they spent hunting them.

Species	Hunters	Days hunted
White-tailed deer	145,935	630,620
Wild turkey[a]	61,413	215,276
Ruffed grouse	76,000	445,000
Bobwhite quail	19,180	91,275
Mourning dove	5,443	33,868
Woodcock	15,000	26,000
Cottontail rabbit	128,000	900,000
Squirrels	178,624	1,247,600
Raccoon	17,000	162,000
Foxes	12,568	62,504

[a] Includes two season; fall 1970 and spring 1971.

Nearly 179,000 licensed hunters spent 1.2 million hunter-days hunting for squirrels in West Virginia. Based on number of hunters, white-tailed deer and cottontail rabbit ranked second and third. Based on number of hunter-days, cottontail rabbit and white-tailed deer ranked second and third. Nearly 894,000 angler-days were devoted to trout fishing in 1970. This represented 15.7 percent of the total licensed fishing effort statewide.

The West Virginia Wildlife Division has made projections of the total number of days that will be expended by hunters and anglers in the pursuit of game animals and fish, based on previous activity. Statewide projected demand in number of hunter and angler days of recreation is:

	1980	*1985*	*1990*
Hunter-days	4,937,000	5,480,000	6,033,000
Angler-days	2,616,000	2,819,000	3,023,000

Wildlife habitat management. These sportsmen's preferences along with the acreage and general condition of the game habitat are important to consider when planning game management programs. Statistics generated during the State's 1975 timber survey provide insight into the character of the existing vegetation in the various cover types and their relative productivity, and when compared to previous surveys reveal important vegetational changes.

Cover type	Character of vegetations			Relative productivity for wildlife[a]
	Mature timber	Immature timber	Open	
	(Million acres)			
Oak-hickory	1.9	2.7	0.1	H
Mixed Appalachian hardwoods	1.2	1.6	—	H
Northern hardwoods	1.6	1.0	[b]	M
White and red pine	[a]	.1	—	L
Virginia pine	.2	.3	—	M
Spruce-fir	[b]	[b]	[b]	L
Elm-ash-cottonwood	.2	.6	—	M
Pasture	—	—	1.4	M
Cropland	—	—	.5	L
Total	5.1	6.3	2.0	

[a] L = Low; M = Medium; and H = High. Ratings were adapted from U.S. Dep. Agric. Forest Service General Technical Report NE-12.

[b] Fewer than 50,000 acres.

With a knowledge of specific wildlife habitat requirements and of the character of the vegetation available at any point in time, crude estimates can be made of the prime habitat acreage that is available. The following compilation gives the current acreages of prime habitat that are available to some of the important West Virginia game species.

Species	Prime habitat[a]
Big game:	(Million acres)
White-tailed deer	8.0
Black bear	2.5
Wild turkey	4.0
Upland game birds:	
Ruffed grouse	7.4
Bobwhite quail	5.8
Ring-necked pheasant	.1
Mourning dove	1.4
Woodcock	.8
Upland game mammals:	
Cottontail rabbit	6.6
Snowshoe hare	.1
Squirrel	7.2

[a] Indicates acreage of cover present that should furnish adequate habitat based on known specie preferences. Does not consider such factors as remoteness or human population density.

Large acreages of prime habitat are currently available to several game animals. This is only partially the result of current land use. Superior environmental adaptability and high mobility also affect the prime habitat acreage. The habitat available to the Bobwhite quail, for example, is limited because their habitat is specific (early plant communities with abundant seed-producing weeds). White-tailed deer, on the other hand, are adapted to many types of vegetative cover as long as the cover is varied. Deer also range over large territories to satisfy their basic needs.

Recent research (Gill, Thomas, et al. 1975) into the relative carrying capacity of seven forest cover types in West Virginia, based on repeated observations of game occurrence, has provided forest land managers with a tool to assist them in developing those timber and wildlife management strategies that are most beneficial for both resources. A comparison of these numerically rated forest type/game relationships allows the systematic consideration of management alternatives and measures the relative magnitude of the trade-offs that might result from management prescriptions.

Management implications of land-use trends. Agriculture, as practiced on the family farm, has been declining in the last quarter century, and as a result, the area in forest cover has been increasing. Statewide, the commercial forest land area has increased from 64 percent of the total land area in 1949 to 74 percent in 1975. Although the State's Northwestern Unit experienced the greatest increase in commercial forest area (up 43 percent), it is still the least forested portion of the State (71 percent). The Southern Unit, which has the greatest percentage of forest cover (78 percent), had the smallest percentage increase (up 1 percent). The Northeastern Unit, which is 74 percent forested, experienced a 17 percent increase.

Abandoned farms and their pastureland are reverting to forest. As grasslands disappear, so do the grassland-dependent species of animal life. They are replaced by animals of the thicket; and these in turn will be replaced by forest-dwelling animals. Over much of the State, selectively harvested forests are closing as young growth fills in the openings around the less desirable and highly defective residual trees. The value of these stands for white-tailed deer is declining, but is improving for the wild turkey and the gray squirrel. Thus, as the plant communities change over time, so do the animals; for each is closely tied to the other.

Habitat requirements and some of the management strategies that may be initiated to improve the local habitat for some of West Virginia's important game animals are listed:

Game species	Habitat requirements and special problems	Positive management strategies
Big Game:		
White-tailed deer	Flourishes in managed young-growth mixed hardwoods in various stages of development interspersed with active farms. Winter food supply, urban development, uncontrolled dogs, and hunter access affect population level.	Control deer population distribution by special hunts. Encourage hunter access to private lands.
Black bear	Requires extensive roadless areas with little human activity.	Administratively reserve existing prime habitat on public lands. Maintain current population levels through controlled harvests.
Wild turkey	Flourishes in mature oak-hickory and northern hardwood stands. Short-rotation timber harvesting and conversion to softwood types is detrimental to increasing population.	Long-rotation timber practices that favor retention of mast-producing trees enhance food supply. Controlled hunts in high population counties maintain good bird distribution.
Upland game birds:		
Ruffed grouse (White 1968)	Prefers early successional plant communities created by timber harvesting, farmland abandonment, restored surface mining, or burning.	Short-rotation timber management. Provide for a variety of human disturbances that will ensure sufficient habitat.
Bobwhite quail	Prefers early successional plant communities created by periodic disturbances.	Provide required habitat by prescribed burning, timber harvest, moderate grazing, raising grain crops.
Mourning dove (Goudy 1975)	Prefers extensive areas of grain crops.	Reverse trend of converting cropland to grassland in West Virginia.

CONTINUED

Continued

Game species	Habitat requirements and special problems	Positive management strategies
Woodcock	Prefers moist areas with brush or low woody vegetation. Dams, stream channelization, intensive agriculture, and pesticides are detrimental.	Encourage greater hunting pressure. Provide early successional plant communities.
Upland game mammals:		
Cottontail rabbits	Prefers early brush vegetative stages dominated by herbaceous vegetation and vines. Herbicide use and progression into sapling state of succession are detrimental.	Short-rotation, even-age harvesting systems, and prescribed burning.
Snowshoe hare	Prefers dense, high-elevation stands of conifer types (above 3,000 feet) interspersed with thickets of shrubs. Large acreages have been converted to northern hardwood types.	Management practices that promote restoration of hardwood stands to conifers.
Squirrels	Prefers mature mast-bearing stands of oak-hickory type. Short rotations and even-aged management are detrimental to nut production and shelter.	All-age management practices that favor mast-producing trees and retain den trees.

Fish resource management

The natural diversity of West Virginia streams and rivers originally provided habitat for a wide range of fish species. As settlement proceeded and the mineral and timber resources were exploited, uncontrolled wildfires occurred and the distribution of the original fish resources was altered. Also, large power and flood control dams were constructed that created large man-made impoundments on some of the major rivers. Current management programs are centered in three main areas: cold water streams, warm water rivers and waterways, and reservoirs and small impoundments.

Cold-water streams. Present cold-water management efforts are focused on the protection and perpetuation of three trout species. Brook trout, a West Virginia native, was originally found in the headwaters of most of the State's rivers. Rainbow and brown trout were introduced. Hatchery records (W. Va. Dept. Natural Resources 1973) show that rainbow trout were introduced into West Virginia streams from the Federal hatchery at White Sulphur Springs in 1903 and that brown trout were introduced in the 1930's.

Fishery managers estimate that there are about 7,580 miles of fish-supporting habitat along the 8,000 streams that drain water from within the State's boundaries (W. Va. Dept. of Natural Resources 1973). About 710 miles of this is cold water fish habitat and 564 miles is known to be supporting populations of native brook trout. In addition, hatchery-raised rainbow and brown trout are living and reproducing along about 26 miles and 10.5 miles of cold water streams respectively. Fishery biologists say that the existing cold water fish habitat could be extended by 144 miles if current pollution levels could be abated.

Problems that effect trout populations can be either physical or chemical. Vegetation removal and stream disturbances can result in widely fluctuating stream-flow, high water temperatures, and sedimentation. Surface runoff carries soil particles and nutrients into the streams. The fine particles produce turbidity, which enhances the absorption of solar energy by the water, raises its temperature, and depletes its oxygen. These changes reduce the trout population. As the soil particles settle, they form a sediment over the stream bottom that chokes off necessary bottom-dwelling organisms and smothers the year's production of trout eggs. Chemical problems are more subtle. Acid mine drainage causes the most serious chemical problems in West Virginia streams, but high total heavy-metal levels have also been know to hamper trout reproduction and diminish oxygen and natural food supplies. The full effects of acid rainfall from industry centers in neighboring states have yet to be evaluated.

West Virginia's trout stocking program is the State's most important ongoing recreation fishing program and accounted for about 40 percent of the total expenditures of fish management funds in 1971. Based on total poundage, trout production from the four State and three Federal hatcheries within the State has climbed 126 percent in the last decade, from 208,000 pounds in 1960 to 470,000 pounds in 1971. Seventy percent of the 1971 poundage was rainbow trout. Trout were released along 887 miles of stream and in 30 impoundments during the year.

Warm-water rivers and waterways. Although sunfishes are the most numerous and widely distributed warm-water game fish, warm-water anglers prefer to fish for small mouth and largemouth bass, walleyes, and catfish (W. Va. Dep. Natural Resources 1973). In 1970, anglers spent 1.6 million angler-days fishing for bass and harvested 2.9 million legal bass. Smallmouth bass especially are recognized as a prized trophy fish and an excellent food fish. Channel catfish, which may attain 15 pounds and 35 inches in major rivers, are an important warm-water sports fish. Nearly 715,000 catfish were harvested in 1970. Other species, such as muskellunge and northern pike, have been introduced from time to time but are still not widely distributed.

In addition to being a game fish, the channel catfish has commercial value. Investigations were first initiated in 1966 to determine the feasibility of opening the Ohio River to commercial fishing. Results showed that the river contained an adequate catfish population to support a commercial fishery, but tests rated the fish low in both taste and odor. Nevertheless, in 1969, two commercial licenses were sold and 3,250 pounds of fish were harvested. Seventy-five percent of the harvest were channel catfish. Eight licenses were issued and 13,970 pounds of fish were harvested in 1970, 83 percent was channel catfish. Commercial fishing was suspended in August 1970 when inspectors found unsafe levels of mercury in freshly harvested fish.

Present warm-water management efforts are keyed to the protection and maintenance of habitat quality along the 6,870 miles of warm-water rivers and streams that now contain fish populations, restoration of warm-water habitat which is too polluted to support game fish, and the reintroduction of game fish into rehabilitated waterways.

Reservoirs and small impoundments. Of the 220 square miles of surface water area in West Virginia, 53 are in impoundments. The Department of Natural Resources manages 106 ponds that contain nearly 15,000 acres of water surface. All of these ponds are open to the public for fishing and contain populations of largemouth bass and bluegills. Many ponds have been stocked with trout and catfish.

Eight large reservoirs, containing over 12,000 acres of water surface, have been constructed by the Corps of Engineers and several local power companies for flood control and power generating purposes. These reservoirs are open for public fishing and contain generally good populations of bass, panfish, and catfish, supplemented by stockings of walleye, muskie, and northern pike. Acid mine drainage is a major fish management problem. Currently, fishery biologists estimate that over a third of the total water surface area of these reservoirs is grossly polluted. (W. Va. Dep. Natural Resources 1973)

Most of the impoundments that have been constructed on private lands are farm ponds either assisted by the Soil Conservation Service or constructed under Public Laws 566 or 534 for soil conservation purposes. Soil Conservation Service records show that 19,822 farm ponds have been constructed with a total surface area of 5,937 acres. A total of 117 P. L. 566 and P. L. 534 impoundments containing some 1,014 acres have been constructed on private lands.

The supply of game fish in impoundments is limited by the area and productivity of the habitat and the ability of the fish population to grow and reproduce under different levels of water quality. The construction of new impoundments usually adds to the supply of desirable fish habitat, especially in the first few years after construction; dredging, siltation, and pollution remove the affected habitat from a productive status.

Habitat requirements and some of the management strategies that may improve the local habitat of some of the important game fish are listed:

Fish species	Habitat requirements and special problems	Positive management strategies
Trout	Requires water temperatures of less than 70° F. and dissolved oxygen of at least 5 ppm. High mineralization has limited reproduction and pollution has destroyed natural habitat.	Rehabilitation of coldwater streams.
Channel catfish	Flourishes in large, deep, low-gradient rivers with clean bottoms of sand, gravel, or boulders. Industrial pollution and high population densities are detrimental to survival and growth.	Stock large man-made impoundments. Encourage commercial harvesting in high population streams.
Muskellunge	Prefers slow flowing, low-gradient streams with long, deep pools that contain submerged brush or logs. These streams range in pH from 6.5 to 7.5, have total alkalinity of 20 to 50 ppm, and hardness of 15 to 75 ppm. Major impoundments and high streamflows destroy habitat and adversely affect reproduction.	Stocking program to expand limited range in West Virginia.
Walleye	Requires large, swift-flowing, clear rivers or deep, clear lakes with gravel, rock, or hard clay bottoms. Siltation of hard bottoms and increased turbidity destroys natural habitat.	Rehabilitation of polluted rivers that otherwise are good habitat. Stock large man-made impoundments.
Largemouth bass	Prefers warm, shallow, mud-bottomed lakes with lush aquatic vegetation and over-hanging, brush-covered banks.	Maintain and improve existing population by encouraging larger harvests and introducing forage species.
Smallmouth bass	Prefers cool flowing streams and large, clear lakes with pH range of 6.7 to 8.5. Acid mine drainage has destroyed the fishery in many West Virginia streams.	Rehabilitation of polluted streams and reintroduction of bass.

RESOURCE MANAGEMENT OPPORTUNITIES

In the previous sections we have presented the current timber resource situation in detail and have predicted how the inventory might look in 2005 if current growth and removal levels are maintained. The current land, water, outdoor recreation, and wildlife situations have also been presented. I have stressed that some natural resource uses are compatible, while others sometimes conflict. In the end, what happens to the land will be determined by public land administrators and private landowners. Obviously, the management of public lands and that of private lands must complement each other if maximum benefits are to be realized from the land. West Virginians have the dual responsibility of managing the land to produce their daily needs and livelihood, and at the same time striving to maintain the quality of their environment. On Federal lands within the State, regional natural-resource needs must also be considered.

In the August 1977 issue of "Wonderful West Virginia", Dave Callaghan, Director of the West Virginia Department of Natural Resources, put it this way:

> Of the few classes of renewable natural resources, our forests are among the most vital life-giving life-preserving. And this vital resource grows with every tick of the clock. I've long felt the role of our woodlands in the 'environmental story' has not been emphasized nor 'dramatized' enough. Sadly, too many people see our woodlands as simply 'a bunch of trees', not properly realizing their importance to life . . . .
>
> . . . . it is well to remember that living trees provide food for humans and wildlife, homes for raccoons, birds, bear and deer. Foliage 'breathes' and consumes carbon dioxide and emits vital oxygen. Our mountain forests shade fallen snow and retard melting; water seeping and filtering through the forest floor of leaves and mosses gives us crystal-clear streams for trout and other wildlife. Perhaps the esthetic value and beauty of a forest are intangible, but it would be a dull person indeed who did not appreciate the red-gold of maple in the fall, the perennial green of a stately spruce or a graceful elm. It is merely hard realism to point out the most obvious use of a tree is for sawtimber and the multitude of by-products. Wood goes into more than 5,000 different products valued in the billions of dollars each year. To consider one local example, it takes 40 to 50 acres of pulp timber to produce one circulation of the Sunday, Charleston Gazette-Mail. And there is no foreseeable shortage of pulpwood for paper making; thanks to the 'growing qualities' of woodlands. In the old days when only virgin or prime trees were harvested, the 'cut-and-get-out' philosophy used only about 50 percent of a cut tree; today 80 percent of the trunk and limbs is utilized.

For each parcel of land, the options for management should be examined; compatible uses based on the location, physical attributes, and limitations of the site should be identified, and an overall management strategy should be developed to assure complete utilization of each acre and a balanced statewide natural-resources program. A team of Forest Service researchers has developed a series of management options for the central Appalachians (Trimble et al. 1974). West Virginia is in the center of the management area and much of the research was conducted at Forest Service research laboratories in the State. This multiple-use management guide has direct application to current management problems. Evaluations are included for the major forest ecosystems found in the State.

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APPENDIX

Definition of terms

Land area classes

Land area. (a) Bureau of the Census. The area of dry land and land that is temporarily or partly covered by water, such as marshes, swamps, and river flood plains; streams, sloughs, estuaries, and canals that are less than 1/8 statute mile in width; and lakes, reservoirs, and ponds that are less than 40 acres in area. (b) Forest Survey. The same as the Bureau of the Census, except that the minimum width of streams, etc., is 120 feet, and the minimum size of lakes, etc., is 1 acre.

Forest land. Land that is at least 16.7 percent stocked (contains at least 7.5 square feet of basal area) by forest trees of any size, or that formerly had such tree cover and is not currently developed for nonforest use. (Forest trees are woody plants that have a well-developed stem and usually are more than 12 feet in height at maturity.) The minimum area for classification of forest land is 1 acre.

Commercial forest land. Forest land that is producing or capable of producing crops of industrial wood (more than 20 cubic feet per acre per year) and is not withdrawn from timber utilization. (Industrial wood: all roundwood products except fuelwood.)

Noncommercial forest land. Forest land that is incapable of yielding timber crops because of adverse site conditions (unproductive forest land), and productive forest land that is withdrawn from commercial timber use (productive-reserved forest land).

Productive-reserved forest land. Forest land that is sufficiently productive to qualify as commercial forest land, but is withdrawn from timber utilization through statute, administrative designation, or exclusive use for Christmas-tree production.

Unproductive forest land. Forest land that is incapable of producing 20 cubic feet per acre per year of industrial wood under natural conditions, because of adverse site conditions.

Nonforest land. Land that has never supported forests, and land formerly forested but now in nonforest use such as for crops, improved pasture, residential areas, and the like.

Ownership classes

National forest. Federal lands that have been legally designated as national forests or purchase units and other lands that are under the administration of the Forest Service.

Other federal. Lands (other than national forests) that are administered by Federal agencies.

State. Lands that are owned by the State of West Virginia or leased to the State for 50 years or more.

County and municipal. Lands that are owned by counties and local public agencies or municipalities or leased to them for 50 years or more.

Forest industry. Lands that are owned by companies or individuals operating wood-using plants.

Farmer-owned. Lands that are owned by farm operators, whether part of the farmstead or not. Excludes land leased by farm operators from nonfarm owners.

Miscellaneous private. Privately owned lands other than forest-industry and farmer-owned lands.

Stand, size classes

Stand. A growth of trees (see definitions under "Tree Classes") on a minimum of 1 acre of forest land that is at least 16.7 percent stocked by forest trees of any size.

Sawtimber stands. Stands that are at least 16.7

percent stocked with growing-stock trees, with half or more of total stocking in sawtimber or poletimber trees, and with sawtimber stocking at least equal to poletimber stocking.

Poletimber stands. Stands that are at least 16.7 percent stocked with growing-stock trees, of which half or more of this stocking is in poletimber and/or sawtimber trees and with poletimber stocking exceeding that of sawtimber.

Sapling-seedling stands. Stands that are at least 16.7 percent stocked with growing-stock trees, of which more than half of the stocking is saplings and/or seedlings.

Nonstocked areas. Commercial forest land that is less than 16.7 percent stocked with growing-stock trees.

Stocking classes

Stocking. The degree of occupancy of land by trees, measured in terms of basal area of trees in a stand compared to the minimum basal area of trees required to utilize fully the growth potential of the land. The actual stocking at a point was evaluated against a standard of 75 square feet of basal area per acre (see definition of basal area under "Tree measurement and volume"). The stocking percentage for a sample plot is the aggregate of the stocking for each of the 10 points. Three categories of stocking are used:

All live trees. These are used in the classification of forest land and forest types.

Growing-stock trees. These are used in the classification of stand-size classes.

Desirable trees. These are used in the classification of area-condition classes.

The degree of plot stocking is viewed as a range of values rather than single points. A fully stocked stand lies within the range of 100 to 133 percent of the basal-area standard. An overstocked stand contains more than 133 percent. The range for medium stocking is 60 to 100 percent and for poor stocking is 16.7 to 60 percent of the basal-area standard. Forest land with less than 16.7 percent of the basal-area standard is classed as nonstocked.

Tree classes

Forest trees. Woody plants that have a well-developed stem and usually are more than 12 feet in height at maturity.

Commercial species. Tree species that are presently or prospectively suitable for industrial wood products. Excludes species of typically small size, poor form, or inferior quality, such as hawthorn and sumac.

Growing-stock trees. Live trees of commercial species that are classified as sawtimber, poletimber, saplings and seedlings; that is, all live trees of commercial species except rough and rotten trees. (See definitions under "Class of timber.")

Acceptable trees. Growing-stock trees of commercial species that meet specified standards of size and quality, but do not qualify as desirable trees.

Desirable trees. Growing-stock trees of commercial species (a) that have no serious quality defects that limit present or prospective use for timber products, (b) that are of relatively high vigor, and (c) that contain no pathogens that may result in death or serious deterioration before rotation age.

Rotten trees. Live trees of commercial species that do not contain at least one 12-foot sawlog or two noncontiguous sawlogs, each 8 feet or longer, now or prospectively, and do not meet regional specifications for freedom from defect primarily because of rot; that is, when more than 50 percent of the cull volume in a tree is rotten.

Rough trees. (a) The same as above, except that rough trees do not meet regional specifications for freedom from defect primarily because of roughness or poor form, and (b) all live trees of noncommercial species.

Site-quality classes

Site class. A classification of forest land in terms of inherent capacity to grow crops of industrial wood. Classifications are based upon the mean annual growth of growing stock attainable in fully stocked natural stands at the culmination of mean annual growth.

Forest types

Forest type. A classification of forest land based upon the species forming a plurality of basal area of live trees. The many local forest types in West Virginia were combined into the following major forest types:

White and red pine. Forests in which eastern white pine, red pine, or jack pine, singly or in combination, make up a plurality of the stocking.

A common associate is hemlock. Important local types included in this major type in West Virginia are the white pine and hemlock types.

Spruce-fir. Forests in which spruce or true firs, singly or in combination, make up a plurality of the stocking. Common components of this type in West Virginia are red spruce and balsam fir.

Virginia and pitch pine. Forests in which loblolly pine, shortleaf pine, Virginia pine, and pitch pine, singly or in combination, make up a plurality of the stocking. The dominant local type included in this major type in West Virginia is the Virginia pine type.

Oak-pine. Forests in which hardwoods (usually upland oaks) form a plurality of the stocking but in which pines make up 25 to 50 percent of the stocking. Important local types included in this major type in West Virginia are the Virginia pine-southern red oak, and other oak-pine types.

Oak-hickory. Forests in which upland oaks or hickory, singly or in combination, make up a plurality of the stocking. A common associate is yellow-poplar. Important local types included in this major type in West Virginia are the white oak-red oak-hickory, chestnut oak, sweetgum—yellow-poplar, and mixed hardwood types.

Elm-ash-cottonwood. Forests in which elm, ash, and cottonwood, singly or in combination, make up a plurality of the stocking. The dominant local type included in this major type in West Virginia is the black ash-elm-red maple type, but the river birch-sycamore type is also included.

Maple-beech-birch. Forests in which maple, beech, or yellow birch, singly or in combination, make up a plurality of the stocking. The dominant local type included in this major type in West Virginia is the sugar maple-beech-yellow birch type, but the black cherry and the black walnut types are also included.

Aspen-birch. Forests in which aspen, balsam poplar, paper birch, or gray birch, singly or in combination, make up a plurality of the stocking. The dominant local type included in this major type in West Virginia is the aspen type.

Class of timber

Softwoods. Coniferous trees that are usually evergreen, having needles or scalelike leaves.

Hardwoods. Dicotyledonous trees that are usually broad-leaved and deciduous.

Sawtimber trees. Live trees of commercial species, (a) that are of the following minimum diameters at breast height—softwoods 9.0 inches and hardwoods 11.0 inches, and (b) that contain at least one 12-foot or two noncontiguous 8-foot merchantable sawlogs and that meet regional specifications for freedom from defect.

Poletimber trees. Live trees of commercial species that meet regional specifications of soundness and form, and are at least 5.0 inches d.b.h. but are smaller than sawtimber size.

Saplings. Live trees of commercial species that are 1.0 to 5.0 inches in diameter at breast height and of good form and vigor.

Seedlings. Live trees of commercial species that are less than 1.0 inch in diameter at breast height and are expected to survive.

Rough and rotten trees. See definitions under "Tree classes."

Timber measurement and volume

Basal area. The area in square feet of the cross-section at breast height of a single tree, or of all the trees in a stand, usually expressed as square feet of basal area per acre.

Board foot. A unit of lumber measurement 1 foot long, 1 foot wide, and 1 inch thick, or its equivalent. By forest-survey convention, softwoods less than 9.0 inches dbh and hardwoods less than 11.0 inches dbh do not contain board-foot volume.

Diameter at breast height (dbh). The diameter outside bark of a standing tree measured at 4 1/2 feet above the ground.

Growing-stock volume. Net volume, in cubic feet, of live growing-stock trees that are 5.0 inches dbh and over, from a 1-foot stump to a minimum 4.0-inch top diameter outside bark of the central stem, or to the point where the central stem breaks into limbs. Net volume equals gross volume less deduction for rot and/or sweep and crook.

International 1/4-inch rule. A log rule, or formula, for estimating the board-foot volume of logs. Stated mathematically, the formula is $((D^2 \times 0.22) - 0.71\,D) \times 0.904762$ for 4-foot sections, where D is the diameter inside bark at the small end of the 4-foot section. The International 1/4-inch rule is used as the USDA Forest Service standard log rule in the northeastern United States.

Standard cord. A unit of measure for stacked bolts of wood, encompassing 128 cubic feet of wood, bark, and air space. Cord estimates can be derived from cubic-foot estimates of growing stock by applying an average factor of 80 cubic feet of wood (inside bark) per rough cord.

Sawtimber volume. Net volume in board feet, International 1/4-inch rule, of merchantable sawlogs in live sawtimber trees. Net volume equals gross volume less deductions for rot, sweep, and other defects that affect use for lumber.

Sawlog. A log that meets minimum standards of diameter, length, and defect, including logs at least 8 feet long, and with a minimum diameter inside bark of 6 inches for softwoods and 8 inches for hardwoods. (See specifications under "Log grade classification.")

Sawlog portion. That part of the bole of a sawtimber tree between a 1-foot stump and the sawlog top.

Sawlog top. The point on the bole of a sawtimber tree above which a sawlog cannot be produced. The minimum sawlog top is 7.0 inches dob (diameter outside bark) for softwoods and 9.0 inches dob for hardwoods.

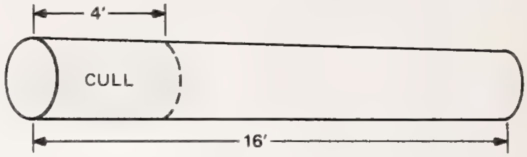
Upper-stem portion. That part of the main stem or fork of a sawtimber tree above the sawlog top to a diameter of 4.0 inches outside bark or to the point where the main stem or fork breaks into limbs.

Log grade classification

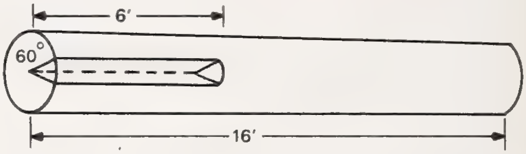
Log grades are based on external characteristics indicative of quality of value. The log-grade standards and grading systems for softwood and hardwood species used in this forest survey of West Virginia are shown on the following pages.

Methods of determining scaling deduction.

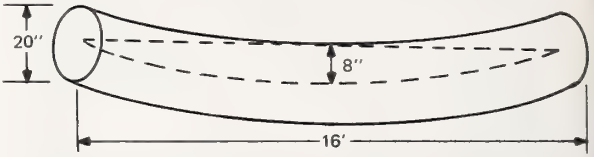
(Examples based on a 16-foot log with 20-inch scaling diameter)



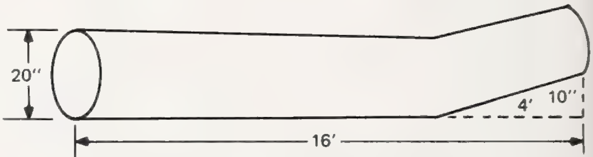
Defect section (rule 1): Percent deduction = $\frac{4}{16}$ = 25%



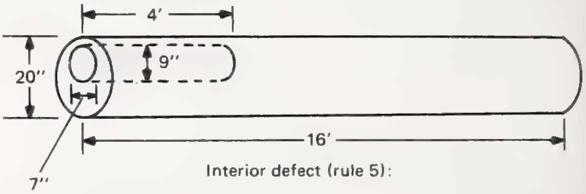
Defect section (rule 2): Percent deduction = $\left(\frac{6}{16}\right)\left(\frac{60}{360}\right)$ = 6-1/4%



Sweep (rule 3): Percent deduction = $\frac{8 - 2}{20}$ = 30%



Crook (rule 4): Percent deduction = $\left(\frac{10}{20}\right)\left(\frac{4}{16}\right)$ = 12-1/2%



Interior defect (rule 5):

Percent deduction = $\frac{(8)\,(10)}{(20 - 1)^2} \times \frac{4}{16}$ = 5-5/9%

In practice each elipse axis can be divided by (20—1)

Thus $\frac{8}{19}$ = .4, $\frac{10}{19}$ .5, and (.4) (.5) $\left(\frac{4}{16}\right)$ = 5%

From: Grosenbaugh, L.R. 1952. Shortcuts for cruisers and scalers. U.S. Dep, Agric. For. Serv. South. For Exp. Stn. Occas. Pap. 126.

SOUTHERN PINE SAWLOGS

Grade 1. Logs with 3 or 4 clear faces.[1] Code 1.

Grade 2. Logs with 1 or 2 clear faces. Code 2.

Grade 3. Logs with no clear faces. Code 3.

After the tentative log grade is established from above, the log will be degraded one grade for each of the following, except that no log can be degraded below grade 3.

1. *Sweep.* Degrade any tentative 1 or 2 log one grade if sweep amounts to 3 or more inches and equals or exceeds one third (1/3) he diameter inside bark at small end. This is the final grade if there is no evidence of heart rot.

2. *Heart rot.* Degrade any tentative 1 or 2 log one grade if conk, massed hyphae, or other evidence of advanced heart rot is found anywhere in it.

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[1] A face is one-fourth of the circumference in width extending full length of the log. Clear faces are those free of: knots measurng more than one-half inch in diameter, overgrown knots of any size, holes more than one-fourth inch in diameter. The faces may e rotated if necessary to obtain the maximum number of clear ones.

Source: Schroeder, J. G., R. A. Campbell, and R. C. Rodenbach. 1968. **Southern pine log grades for yard and structural lumber.** U.S. Dep. Agric. For. Serv. Res. Pap. SE-39.

EASTERN WHITE PINE SAWLOG GRADE SPECIFICATIONS

GRADING FACTOR	LOG GRADE 1	LOG GRADE 2	LOG GRADE 3	LOG GRADE 4
(1) MINIMUM SCALING DIAMETER (inches)	14[1]	6	6	6
(2) MINIMUM LOG LENGTH (feet)	10[2]	8	8	8
(3) MAXIMUM WEEVIL INJURY (number)	None	None	2 injuries[3]	No limit
(4) MINIMUM FACE REQUIREMENTS	Two full length or four 50% length good faces.[4] (In addition, log knots on balance of faces shall not exceed size limitations of grade 2 logs.)	No GOOD FACES REQUIRED. Maximum diameter of log knots on three best faces:		Includes all logs not qualifying for No. 3 or better and judged to have at least one-third of their gross volume in sound wood suitable for manufacture into standard lumber
		SOUND RED KNOTS not to exceed 1/6 scaling diameter and 3 inch maximum. **DEAD OR BLACK KNOTS** including overgrown knots not to exceed 1/12 scaling diameter and 1½ inch maximum.	**SOUND RED KNOTS** not to exceed 1/3 scaling diameter and 5 inch maximum. **DEAD OR BLACK KNOTS** including overgrown knots not to exceed 1/6 scaling diameter and 2½ inch maximum.	
(5) MAXIMUM SWEEP OR CROOK ALLOWANCE (percent)	20	30	40	66⅔
(6) MAXIMUM TOTAL SCALING DEDUCTION (percent)	50	50	50	66⅔

After the tentative log grade is established from face examination, the log will be reduced in grade whenever the following defects are evident:

(7) CONKS, PUNK KNOTS, AND PINE BORER DAMAGE ON BARK SURFACE[5]

Degrade one grade if present on one face.
Degrade two grades if present on two faces.
Degrade three grades if present on three or more faces.

(8) LOG END DEFECTS: RED ROT, RING SHAKE, HEAVY STAIN AND PINE BORER DAMAGE OUTSIDE HEART CENTER OF LOG[5]

Consider log as having a total of 8 quarters (4 on each end) and degrade as indicated below:
Degrade one grade if present in 2 quarters of log ends.
Degrade two grades if present in 3 or 4 quarters of log ends.
Degrade three grades if present in 5 or more quarters of log ends.

[1] 12 and 13 inch logs with four full length good faces are acceptable.
[2] 8 foot logs with four full length good faces are acceptable.
[3] 8 foot No. 3 logs limited to one weevil injury
[4] Minimum 50% length good face must be at least 6 feet
[5] Factors 7 and 8 are not cumulative (total degrade based on more serious of the two). No log to be degraded below grade 4 if net scale is at least one-third gross log scale.

Source: Ostrander, M. D., and R. L. Brisbin. 1971. **Sawlog grades for Eastern white pine.** U.S. Dep. Agric. For. Serv. Res. Pap. NE-205.

SPRUCE, FIR, HEMLOCK, TAMARACK, AND CEDAR LOG GRADE

(Minimum merchantability specifications)

Log grade	*Minimum size*		*Defect allowance*		Other requirements
	Diameter[1]	*Length*[2]	*Sweep or crook*	*Total deduction*	
	Inches	*Feet*	*Percent*	*Percent*	
1	10-12	8-16 in 2-foot multiples	25	50	Sound knots not over 2 inches in diameter permitted. Shake permitted up to 20 percent of gross scale if not combined with other serious defects.
	13 +	8-16 in 2-foot multiples	25	50	Sound knots not over 3 inches in diameter permitted. Shake permitted up to 20 percent of gross scale if not combined with other serious defects.

[1] At small end of log.

[2] Without trim.

STANDARD GRADES FOR HARDWOOD FACTORY LUMBER LOGS.[a]

Grading Factors		Log grades							
		F1			F2				F3
Position in tree		Butts only	Butts & uppers		Butts & uppers				Butts & uppers
Scaling diameter, inches		13-15[b]	16-19	20 +	11 +[c]	12 +			8 +
Length without trim, feet		10 +			10 +	*8-9*	*10-11*	*12 +*	8 +
Required clear cuttings[d] of each of 3 best faces[e]	Min. length, feet	7	5	3	3	3	3	3	2
	Max. number	2	2	2	2	2	2	3	No limit
	Min. proportion of log length required in clear cutting	5/6	5/6	5/6	2/3	3/4	2/3	2/3	1/2
Maximum sweep & crook allowance	For logs with less than 1/4 of end in sound defects	15%			30%				50%
	For logs with more than 1/4 of end in sound defects	10%			20%				35%
Maximum scaling deduction		40%[f]			50%[g]				50%

End defects, although not visible in standing trees, are important in grading cut logs. Instructions for dealing with this factor are contained in Forest Prod. Lab. Rpt. D 1737.

[a] From USDA Forest Service Research Paper FPL-63 (13).

[b] Ash and basswood butts can be 12 inches if they otherwise meet requirements for small #1's.

[c] Ten-inch logs of all species can be #2 if they otherwise meet requirements for small #1's.

[d] A clear cutting is a portion of a face, extending the width of the face, that is free of defects.

[e] A face is 1/4 of the surface of the log as divided lengthwise.

[f] Otherwise #1 logs with 41-60% deductions can be #2.

[g] Otherwise #2 logs with 51-60% deductions can be #3.

STANDARD SPECIFICATIONS FOR HARDWOOD CONSTRUCTION LOGS.[a]

Position in tree		Butt & upper
Min. diameter, small end		8 inches +
Min. length, without trim		8 feet
Clear cuttings		No requirements.
Sweep allowance, absolute		1/4 diameter small end for each 8 feet of length.
Sound surface defects	Single knots	Any number, if no one knot has an average diameter above the callus in excess of 1/3 of log diameter at point of occurrence.
	Whorled knots	Any number if sum of knot diameters above the callus does not exceed 1/3 of log diameter at point of occurrence.
	Holes	Any number provided none has a diameter over 1/3 of log diameter at point of occurrence, and none extends over 3 inches into included timber.[b]
Unsound surface defects		Same requirements as for sound defects if they extend into included timber.[b] No limit if they do not.
End defects	Sound	No requirements.
	Unsound	None allowed; log must be sound internally, but will admit 1 shake not to exceed 1/4 the scaling diameter and a longitudinal split not extending over 5 inches into the contained timber.

[a] These specifications are minimum for the class. If, from a group of logs, factory logs are selected first, thus leaving only non-factory logs from which to select construction logs, then the quality range of the construction logs so selected is limited, and the class may be considered a grade. If selection for construction logs is given first priority, then it may be necessary to subdivide the class into grades.

[b] Included timber is always square, and dimension is judged from small end.

From: Rast, E. D., D. L. Sonderman, and G. L. Gammon, A GUIDE TO HARDWOOD LOG GRADING (REVISED). USDA For. Serv. Gen. Tech. Rep. NE-1, 1973.

Annual net growth and timber removals

(In cubic feet for growing stock and in board feet for sawtimber)

Average annual net growth. The change (resulting from natural causes) in net volume during the period between surveys, divided by the number of years in the period. Components of annual net growth include the increment in net volume of trees present at the beginning of the period and surviving to its end, plus net volume of trees that attain the minimum size to enter the class during the period, minus the net volume of trees that died during the period, minus the net volume of trees that became rough or rotten trees during the period.

Average annual ingrowth. The net volume of trees now included in the class that were not tallied as such on the initial survey, divided by the number of years between surveys.

Average annual cull increment. The net volume of trees that became rough or rotten trees during the period between surveys, divided by the number of years between surveys.

Average annual mortality. The net volume removed from the class because of death from natural causes during the period between surveys, divided by the number of years between surveys.

Average annual removals. The net volume of trees harvested or killed in logging, cultural operations such as timber-stand improvement, land-clearing, or changes in land use during the period between surveys, divided by the number of years between surveys.

Current annual net growth, removals, and mortality. The estimated level of annual growth, removals, and mortality on commercial forest land during the year of the most recent inventory (1974 for West Virginia).

Logging residues. The unused growing-stock volume of trees cut for products and the total growing-stock volume of trees cut for products and the total growing-stock volume of trees destroyed in the course of logging but not removed for products.

Other removals. The growing-stock volume of trees that were removed from the inventory (and not used for products) by cultural operations (weeding, thinning, etc.), land-clearing, and reclassification of some commercial forest land as noncommercial forest land.

Plant byproducts. Wood products such as slabs, edgings, and veneer cores that are incidentally produced in the production of timber products and are utilized in the manufacture of other timber products. (Bark is not included.)

Plant residues. Wood material incidentally produced in the production of timber products but not utilized.

Roundwood products. Logs, bolts, or other round sections cut from growing stock or nongrowing stock for industrial or nonindustrial uses.

Previous inventories

The initial inventory of West Virginia's forest resources was begun in 1948. Some 31,000 photo points were examined stereoscopically and classified by land use and density. Field crews located 3,034 of the photo points on the ground and 1/5-acre circular plots were established and monumented at all forested locations. Tree and area data were recorded at each location.

In 1959, a second West Virginia forest resource survey was begun. This inventory used the sampling-with-partial replacemnet (SPR) design. With this design, estimates of forest area and timber volume were made by combining a subsample of remeasured plots, a regression up-dating of the previous inventory, and a new independent photo- and ground-plot inventory. Thus the SPR design, by combining two independent estimates of the inventory, yielded a better estimate of West Virginia's timber resource at a given cost.

A portion (344) of the 1948 ground plots were remeasured and then used with appropriate regression techniques to update all of the 1948 plot estimates to 1961. At the same time, 13,500 photo points on recent photography were stratified into land use and volume classes. A total of 1,205 of the new photo points were located and monumented in the field, and 10-point BAF 40 prism sample plots were established at each forested sample location. The data collected on the new ground plots were expanded into an independent estimate of forest area and volume for West Virginia in 1961.

At this point the two independent estimates (based on remeasured and new ground plots) were combined, using a variance reciprocal weighting procedure to yield a single area and volume estimate with a lower combined sampling error than either of the two separate estimates. The 1/5-acre remeasured plots were also used to estimate average annual growth, mortality, and removals; since each tree measured was reconciled and a tree history code assigned, they could be used to determine the components of change.

The 1973-74 inventory

A current set of aerial photographs for West Virginia was used to separate the State into land use, volume, and major forest-type strata. Approximately 20,000 photo points were classified, and when photo interpretation was completed, 978 forested points and 233 nonforest points were selected for ground sampling. A number of points proportional to the area in the photo stratum were chosen randomly within each stratum.

An estimate of current area and volume was calculated based upon the photographic points and ground plots. Growth and the other change components were developed from the remeasurement of 201 1/5-acre plots that were originally established in 1948, remeasured in 1961, and measured a third time in 1973-74. A tree-by-tree reconcilation was made on each remeasured plot to develop accurate tree histories for each remeasured stand.

County data

Many users of forest-survey data have shown a need for county information. To provide such information within the framework of the survey design, tables for counties where more than one county makes up a geographic stratum have been developed by a survey-unit partitioning technique.

First, the geographic stratum means and variances for the various photo-plot strata were applied to the photo-plot data for each county within the stratum. This yielded an estimate of total volume or total commercial forest-land area for each county. Next the data from all the new ground plots in each geographic stratum were used to partition the county totals into their various components. For example, if a table of cubic-foot volume by softwoods and hardwoods is to be made for a county, the estimate of total cubic-foot volume for that county is partitioned into softwood and hardwood totals according to the proportion of softwoods and hardwoods for all new forest-survey ground plots within the geographic stratum.

Data processing

Field-tally data consisting of plot and individual-tree information were processed and compiled into various tables, using FINSYS—Forest Inventory System—on modern large-capacity high-speed computers.

FINSYS is a data-processing system developed by the Northeastern Forest Experiment Station to process and compile large volumes of forest-inventory data. It consists of an editing subsystem that edits field-tally data for errors; a table-compiling subsystem that compiles tables from edited field data; and finally, the output subsystem that expands the plot data to geographic unit or statewide estimates and prints the final tables.

FINSYS was described by R.W. Wilson and R.C. Peters in 1967 in Forest Service Research Papers NE-61 and NE-71 to NE-78.

FINSYS has several features that make it unique. One of these is the ability to calculate not only inventory estimates but also the variance and sampling error for each estimate. This feature provides the user with a measure of the reliability of each statistic and the ability to determine the reliability of a new estimate based upon a data combination he may make.

Another feature of FINSYS is its flexibility. The system is not restricted to the Northeastern Forest Survey; it can be used for any large-scale forest inventory. Also, it does not produce a standard set of tables; the individual user specifies the tables to be developed according to his particular need. Thus, at any stage in the data processing phase, or even at a later date, a specific table can be developed with minimum effort.

Comparisons between inventories

After inventories have been completed for several points in time it is desirable to evaluate the trends between the several inventories and to make comparisons.

A comparison of the 1973-74 and 1961 forest-survey estimates of volume, growth, removals, and mortality was made for West Virginia. A computer program TRAS (Timber Resource Analysis System), was used. TRAS has been described in two publications by R.W. Larson and M.H. Goforth: TRAS, a computer program for the projection of timber volume (For. Serv. Agric. Hdbk. 377, June 1970) and TRAS, a timber volume projection model (For. Serv. Tech. Bull. 1508, Dec. 1974).

Because of changes in the procedures and in definitions, it was necessary to adjust the 1961 inventory volume estimte to what it would have been had the 1973-74 procedures and definitions been used in 1961. One important step in this process is to multiply the average net volume per tree (for softwoods and for hardwoods) developed from the resurvey for each 2-inch diameter class by the number of trees in that diameter class in the 1961 inventory.

Volume estimates also differed between inventories because the definitions of what constitutes a merchantable sawtimber tree differed. In 1961, sawtimber trees had to contain at least one merchantable 8-foot sawlog; in 1974, at least one 12-foot sawlog or two noncontiguous 8-foot sawlogs were required. The changes in the 1961 volume estimates for West Virginia are as follows:

- For softwood growing stock, the adjusted volume is 2 percent less than reported.
- For hardwood growing stock, the adjusted volume is 2 percent less than reported.
- For softwood sawtimber, the adjusted volume is 14 percent less than reported.
- And for hardwood sawtimber, the adjusted volume is 24 percent less than reported.

The adjusted 1961 volume estimates, not the volume estimates published in the report for the 1961 resurvey, are used for comparisons between surveys in this report.

Reliability of the estimates

The forest-area and timber-volume data presented in this report were based upon a carefully designed sample of forest conditions throughout West Virginia. However, since neither every acre nor every tree in the region was measured, the data presented in this report are estimates. A measure of the reliability of these estimates is given by the sampling error calculated for this report. Many of these appear on the data tables.

Briefly, this is how the sampling error indicates the reliability of an estimate: Our estimate of the total growing-stock volume in West Virginia—13,515 million cubic feet—has an associated sampling error of 2 percent (270 million cubic feet). This means that our best estimate of the total growing-stock volume in West Virginia in 1975 is 13,515 million cubic feet. If there are no errors in procedure, the odds are 2 to 1 that, if we repeated the survey in the same way the resulting estimates of growing-stock volume would be betweeen 13,245 million and 13,785 million cubic feet (13,515 ± 270). Similarly, the odds are 19 to 1 that it would be within ± 541 million cubic feet and 300 to 1 that it would be within ± 811 million cubic feet.

The computed sampling error is not a complete measure of reliability; there are other sources of error that this term does not include. There could be imperfections in the volume tables and equations, and errors in field measurement. Procedural errors were kept to a minimum by careful training of all field personnel, frequent inspection of field work, and application of the most reliable survey methods.

Computed sampling errors for the totals shown in the statistical tables for West Virginia are:

	Sampling error (Percent)
Commercial forest area: 11,483.7 thousand acres	1
Growing-stock volume: 13,515.4 million cubic feet	2
Sawtimber volume: 27,630.8 million board feet	2
Annual net growth: 473.5 million cubic feet	8
Annual removals: 166.1 million cubic feet	15

Commercial tree species of West Virginia

Scientific name[3]	*Common name*	*Occurrence*[4]
	Softwoods	
Abies balsamea	Balsam fir	r
Juniperus virginiana	Eastern redcedar	r
Picea rubens	Red spruce	r
Pinus echinata	Shortleaf pine (Yellow)[5]	r
P. pungens	Table-Mountain pine	r
P. resinosa	Red pine	vr
P. rigida	Pitch pine	r
P. strobus	Eastern white pine	c
P. sylvestris	Scotch pine[6]	vr
P. virginiana	Virginia pine (Scrub)	c
Thuja occidentalis	Northern white-cedar	vr
Tsuga canadensis	Eastern hemlock	c
	Hardwoods	
Acer rubrum	Red maple (Soft)	vc
A. saccharinum	Silver maple	vr
A. saccharum	Sugar maple (Hard)	vc
Aesculus species	Buckeye	r
Betula alleghaniensis	Yellow birch	c
B. lenta	Sweet birch (Black)	c
B. nigra	River birch (Red)	vr
B. papyrifera	Paper birch (White)	vr
Carya species	Hickory	vc
Castanea dentata	American chestnut	r
Celtis occidentalis	Hackberry (Sugar berry)	r
Cornus florida	Flowering dogwood	c
Diospyros virginiana	Common persimmon	r
Fagus grandifolia	American beech	c
Fraxinus species	Ash	c
Gleditsia triacanthos	Honeylocust	vr
Ilex opaca	American holly	vr
Juglans cinerea	Butternut	r
J. nigra	Black walnut	c
Liquidambar styraciflua	Sweetgum	vr
Liriodendron tulipifera	Yellow-poplar (Tuliptree)	vc
Magnolia species	Magnolia	c
Nyssa sylvatica	Blackgum (Tupelo)	c
Platanus occidentalis	American sycamore (Buttonwood)	r
Populus deltoides	Eastern cottonwood	vr
P. grandidentata	Bigtooth aspen (Popple)	r
P. tremuloides	Quaking aspen (trembling)	r
Prunus serotina	Black cherry	c
Quercus alba	White oak (Stave)	vc
Q. bicolor	Swamp white oak	vr
Q. coccinea	Scarlet oak	c
Q. imbricaria	Shingle oak	vr

Continued

Scientific name[3]	*Common name*	*Occurrence*[4]
Q. macrocarpa	Bur oak	vr
Q. muehlenbergii	Chinkapin	vr
Q. palustris	Pin oak	vr
Q. prinus	Chestnut oak (Rock)	vc
Q. rubra	Northern red oak	c
Q. stellata var. stellata	Post oak	r
Q. velutina	Black oak (Yellow bark)	c
Robinia pseudoacacia	Black locust	c
Salix nigra	Black willow	vr
Tilia americana	American basswood (Linden)	c
Ulmus species	Elm	c

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[3] Name according to: Little, Elbert L., Jr., Checklist of Native and Naturalized Trees of the United States (including Alaska). U.S. Dept. Agric. Handb. 41. 472 p. 1953.

[4] Occurrence is based on the frequency at which the species was encountered on forest survey field plots: vr—very rare, r—rare, c— common, and vc—very common.

[5] Names in parenthesis are other frequently used common names.

[6] Species introduced into West Virginia.

Metric equivalents of units used in this report

1 acre = 4,046.86 square meters or 0.405 hectare.
1,000 acres = 405 hectares.
1,000,000 acres = 405,000 hectares.
1,000 board feet (International 1/4-inch log rule) = 3.48 cubic meters.
1,000,000 board feet (International 1/4-inch log rule) = 3,480 cubic meters.
Breast height = 1.4 meters above ground level.
1 cubic foot = 28,317 cubic centimeters or 0.028317 cubic meter.
1,000 cubic feet = 28,317 cubic meters.
1,000,000 cubic feet = 28,317 cubic meters.
1 cord (wood, bark, and airspace) = 3.6246 cubic meters.
1 cord (solid wood, pulpwood) = 2.4069 cubic meters.
1 cord (solid wood, other than pulpwood) = 2.2654 cubic meters.
1,000 cords (pulpwood) = 2,406.9 cubic meters.
1,000 cords (other products) = 2,265.4 cubic meters.
1 foot = 30.48 centimeters or 0.3048 meter.
1 inch = 25.4 millimeters or 2.54 centimeters or 0.0254 meter.
1 mile = 1.609 kilometers.
1 square foot = 929.03 square centimeters or 0.0929 square meter.

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Table 1.—*Area by land classes, West Virginia, 1975*

Land class	Area	
	Thousand acres	*Percent*
Forest land:		
Commercial	11,483.7	74
Productive reserved	115.5	1
Christmas tree land	8.9	([a])
Unproductive	24.5	([a])
Total forest land	11,632.6	75
Nonforest land:		
Cropland[b]	518.0	4
Pasture[b]	1,404.8	9
Other[c]	1,858.4	12
Total nonforest land	3,781.2	25
Total area[d]	15,413.8	100

[a] Less than 0.5 percent.

[b] Based on forest survey plots and Census of Agriculture historical data.

[c] Includes swampland, industrial and urban areas, other nonforest lands, and 29,700 acres, classed as water by forest survey standards, but defined by the Bureau of the Census as land.

[d] Source: United States Bureau of the Census, Areas of West Virginia: 1960 (April 1967).

Table 2.—*Area of commercial forest land, by ownership classes, West Virginia, 1975*

Ownership class	Area[a]	
	Thousand acres	*Percent*
National Forest	872.6	8
Other federal	39.1	([b])
State	228.9	2
County and municipal	.2	([b])
Total public	1,140.8	10
Forest industry	879.7	8
Farmer-owned	1,927.6	17
Miscellaneous private:		
Individual	4,787.8	42
Corporate	1,752.3	15
Other	995.5	9
Total private	10,342.9	90
All ownerships	11,483.7	100

[a] Estimates of area in each private ownership class are based on a forest-land ownership study by the Northeastern Forest Experiment Station.

[b] Less than 0.5 percent.

Table 3.—*Area of commercial forest land, by stand-size and ownership classes, West Virginia, 1975*

(In thousands of acres)

Stand-size class	All ownerships	National Forest	Other public	Forest industry	Farmer and other
Sawtimber stands	5,075.7	464.1	84.2	580.6	3,946.8
Poletimber stands	3,959.6	346.7	143.0	212.1	3,257.8
Sapling-seedling stands	2,306.1	45.4	36.0	87.0	2,137.7
Nonstocked areas	142.3	16.4	5.0	—	120.9
All classes	11,483.7	872.6	268.2	879.7	9,463.2

Table 4.—*Area of commercial forest land, by stand-volume and ownership classes, West Virginia, 1975*

(In thousands of acres)

Stand-volume per acre (board feet)[a]	All ownerships	National Forest	Other public	Forest industry	Farmer and other
Less than 1,500	4,577.8	104.9	117.8	214.1	4,141.0
1,500 to 5,000	4,962.8	328.7	119.8	428.6	4,085.7
More than 5,000	1,943.1	439.0	30.6	237.0	1,236.5
All classes	11,483.7	872.6	268.2	879.7	9,463.2

[a] International 1/4-inch rule.

Table 5.—*Area of commercial forest land, by stocking classes based on selected stand components, West Virginia, 1975*

(In thousands of acres)

Stocking class[a] (percent)	Stocking classified in terms of—				
	All trees	Growing-stock trees			Rough and rotten trees
		Total	Desirable	Acceptable	
160	18.0	—	—	—	—
150 to 160	209.2	11.6	—	—	—
140 to 150	854.6	49.7	—	29.2	8.9
130 to 140	1,863.2	186.5	—	56.2	—
Overstocked	2,945.0	247.8	—	85.4	8.9
120 to 130	2,501.7	579.0	—	270.4	—
110 to 120	2,464.0	989.4	—	606.7	18.7
100 to 110	1,562.5	1,665.2	—	1,191.7	46.7
Fully stocked	6,528.2	3,233.6	—	2,068.8	65.4
90 to 100	1,061.8	1,902.5	9.9	1,693.9	42.6
80 to 90	402.5	1,682.6	—	1,904.0	111.0
70 to 80	230.2	1,410.4	—	1,785.8	290.5
60 to 70	125.1	1,269.0	—	1,626.2	476.3
Medium stocked	1,819.6	6,264.5	9.9	7,009.9	920.4
50 to 60	72.1	778.0	120.5	1,111.8	955.4
40 to 50	68.8	448.2	134.1	624.5	1,337.3
30 to 40	13.8	197.3	303.7	252.5	2,057.3
20 to 30	1.6	162.0	852.6	178.5	2,343.2
10 to 20	9.7	84.0	2,083.5	74.7	2,157.0
Less than 10	24.9	68.3	7,979.4	77.6	1,638.8
Poorly stocked	190.9	1,737.8	11,473.8	2,319.6	10,489.0
All classes	11,483.7	11,483.7	11,483.7	11,483.7	11,483.7

[a] Fully stocked stands are considered to contain 75 to 100 square feet of basal area per acre.

Table 6.—*Area of commercial forest land, by area condition and ownership classes, West Virginia, 1975*

(In thousands of acres)

Area-condition class[a]	All ownerships	National Forest	Other public	Forest industry	Farmer and other
Class *10*	284.6	284.6	—	—	—
Class *20*	105.3	105.3	—	—	—
Class *30*	107.1	107.1	—	—	—
Class *40*	170.4	160.5	—	9.9	—
Class *50*	1,932.1	66.8	59.0	152.3	1,654.0
Class *60*	6,644.1	91.9	104.1	487.4	5,960.7
Class *70*	2,240.1	56.4	105.1	230.1	1,848.5
All classes	11,483.7	872.6	268.2	879.7	9,463.2

[a] Class *10*.—Areas fully stocked with desirable trees and not overstocked.

Class *20*.—Areas fully stocked with desirable trees, but overstocked with all live trees.

Class *30*.—Areas medium to fully stocked with desirable trees, and with less than 30 percent of the area controlled by other trees and/or inhibiting vegetation or surface conditions that will prevent occupancy by desirable trees.

Class *40*.—Areas medium to fully stocked with desirable trees and with 30 percent or more of the area controlled by other trees and/or conditions that ordinarily prevent occupancy by desirable trees.

Class *50*.—Areas poorly stocked with desirable trees, but fully stocked with growing-stock trees.

Class *60*.—Areas poorly stocked with desirable trees, but with medium to full stocking of growing-stock trees.

Class *70*.—Areas poorly stocked with desirable trees, and poorly stocked with growing-stock trees.

Table 7.—*Area of commercial forest land, by potential site productivity and ownership classes, West Virginia, 1975*

(In thousands of acres)

Growth-per-acre class (cubic feet)	All ownerships	National Forest	Other public	Forest industry	Farmer and other
120 to 165	1,041.8	164.2	22.2	113.1	742.3
85 to 120	3,718.7	384.7	111.2	438.6	2,784.2
50 to 85	4,754.5	244.2	110.9	261.4	4,138.0
Less than 50	1,968.7	79.5	23.9	66.6	1,798.7
All classes	11,483.7	872.6	268.2	879.7	9,463.2

Table 8.—*Area of commercial forest land, by forest types and ownership classes, West Virginia, 1975*

(In thousands of acres)

Forest type	All ownerships	National Forest	Other public	Forest industry	Farmer and other
White and red pine	101.2	4.2	—	8.8	88.2
Spruce-fir	59.0	36.3	—	18.0	4.7
Virginia and pitch pine	485.2	.9	7.4	17.8	459.1
Oak-pine	568.2	86.2	9.5	8.9	463.6
Oak-hickory	6,828.1	260.0	197.1	387.7	5,983.3
Elm-ash-cottonwood	814.5	12.8	4.4	75.4	721.9
Maple-beech-birch	2,618.6	472.2	49.8	363.1	1,733.5
Aspen-birch	8.9	—	—	—	8.9
All types	11,483.7	872.6	268.2	879.7	9,463.2

Table 9.—*Area of commercial forest land, by forest types and stand-size classes, West Virginia, 1975*

(In thousands of acres)

Forest type	All stands	Saw-timber stands	Pole-timber stands	Sapling-seedling stands	Non-stocked areas
White and red pine	101.2	36.8	54.1	10.3	-
Spruce-fir	59.0	43.6	14.0	1.1	0.3
Virginia and pitch pine	485.2	163.7	173.9	147.6	-
Oak-pine	568.2	221.6	172.7	164.3	9.6
Oak-hickory	6,828.1	2,794.4	2,455.5	1,465.7	112.5
Elm-ash-cottonwood	814.5	258.4	282.1	274.0	
Maple-beech-birch	2,618.6	1,557.2	807.3	243.1	11.0
Aspen-birch	8.9	—	—	—	8.9
All types	11,483.7	5,075.7	3,959.6	2,306.1	142.3

Table 10.—*Area of commercial forest land by local forest types and major forest types, West Virginia, 1975*

(In thousands of acres)

Local forest type and major forest type	Area
White pine	37.9
Hemlock	63.3
Total, white and red pine	101.2
Red spruce-balsam fir	59.0
Total, spruce-fir	59.0
Shortleaf pine	12.2
Virginia pine	450.9
Pitch pine	22.1
Total, Virginia and pitch pine	485.2
White pine-northern red oak-white ash	27.6
Virginia pine-southern red oak	396.7
Shortleaf pine-hardwoods	36.1
Other oak-pine	107.8
Total, oak-pine	568.2
Post, black, or bear oak	349.1
Chestnut oak	1,062.2
White oak-red oak-hickory	1,594.4
White oak	706.5
Northern red oak	242.8
Yellow-poplar—white oak—no. red oak	572.8
Sweetgum—yellow-poplar	683.6
Mixed hardwoods	1,616.7
Total, oak-hickory	6,828.1
Black ash-elm-red maple	764.9
River birch-sycamore	49.6
Total, elm-ash-cottonwood	814.5
Sugar maple-beech-yellow birch	2,422.9
Black cherry	152.7
Black walnut	43.0
Total, maple-beech-birch	2,618.6
Aspen	8.9
Total, aspen-birch	8.9
All types	11,483.7

Table 11.—*Area of noncommercial forest land, by forest types, West Virginia, 1975*

(In thousands of acres)

Forest type	All areas	Productive-reserved areas	Unproductive areas
Spruce-fir	8.0	3.0	5.0
Virginia and pitch pine	17.3	11.4	5.9
Oak-pine	12.5	.9	11.6
Oak-hickory	51.8	50.8	1.0
Elm-ash-cottonwood	1.8	1.8	—
Maple-beech-birch	57.5	56.5	1.0
All types	148.9	124.4	24.5

Table 12.—*Number of trees on commercial forest land by species groups, tree classes, and diameter classes, West Virginia, 1975*

(In thousands of trees)

Dbh class (inches)	Softwoods			Hardwoods		
	Growing-stock trees	Rough and rotten trees	Total	Growing-stock trees	Rough and rotten trees	Total
Poletimber:						
5.0 to 6.9	43,729	7,798	51,527	430,797	184,178	614,975
7.0 to 8.9	33,021	3,918	36,939	264,040	71,284	335,324
9.0 to 10.9	—	—	—	167,698	34,405	202,103
Total	76,750	11,716	88,466	862,535	289,867	1,152,402
Small sawtimber:						
9.0 to 10.9	16,897	2,579	19,476	—	—	—
11.0 to 12.9	10,194	751	10,945	92,862	23,617	116,479
13.0 to 14.9	4,537	518	5,055	62,717	12,679	75,396
Total	31,628	3,848	35,476	155,579	36,296	191,875
Large Sawtimber:						
15.0 to 16.9	2,372	166	2,538	36,727	7,591	44,318
17.0 to 18.9	1,140	—	1,140	19,584	5,411	24,995
19.0 to 20.9	623	22	645	10,441	3,433	13,874
21.0 to 28.9	447	66	513	11,132	5,719	16,851
29.0 and larger	35	—	35	957	1,400	2,357
Total	4,617	254	4,871	78,841	23,554	102,395
All classes	112,995	15,818	128,813	1,096,955	349,717	1,446,672

Table 13.—*Number of growing-stock trees on commercial forest land, by species and diameter classes, West Virginia, 1975*

(In thousands of trees)

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Virginia pine	64,644	27,574	19,114	10,066	5,155	1,969	599	167	—	—	—
Other yellow pines	13,185	3,461	4,586	2,701	1,384	615	345	50	43	—	—
White pine	10,314	3,532	3,841	1,087	799	307	149	222	196	151	30
Red spruce	7,692	1,081	1,613	1,557	1,479	785	713	280	123	61	—
Hemlock[a]	17,160	8,081	3,867	1,486	1,377	861	566	421	261	235	5
Total softwoods	112,995	43,729	33,021	16,897	10,194	4,537	2,372	1,140	623	447	35
Select white oaks[b]	114,106	42,150	28,320	18,223	10,893	6,712	3,753	2,006	1,129	798	122
Select red oaks[c]	75,992	22,291	15,292	13,063	7,984	5,844	4,574	2,733	1,734	2,234	243
Other white oaks[d]	125,500	47,603	29,907	19,897	10,295	7,650	3,967	2,710	1,613	1,700	158
Other red oaks[e]	104,255	36,207	24,312	15,719	8,251	8,321	4,930	2,922	1,534	1,852	207
Red maple	94,983	44,681	25,183	12,906	6,492	3,378	1,142	643	191	336	31
Sugar maple	74,313	32,023	18,101	12,886	4,893	3,059	1,592	708	331	675	45
Yellow birch	17,836	9,148	5,083	2,179	591	129	274	104	143	185	—
Sweet birch	35,209	19,207	8,503	4,530	1,401	994	264	116	148	46	—
Hickory	126,776	57,937	32,884	18,379	8,907	4,532	2,246	1,132	409	341	9
Beech	44,713	16,091	9,222	6,966	4,852	2,795	2,446	1,088	544	655	54
Ash	27,335	11,558	6,722	2,668	2,896	1,680	1,065	410	140	184	12
Black walnut	10,609	4,085	2,415	1,934	915	662	324	122	59	93	—
Yellow-poplar	103,246	33,289	23,334	16,619	11,422	8,434	5,341	2,761	1,130	878	38
Cucumbertree	10,954	3,273	3,531	1,470	1,388	565	459	158	98	12	—
Blackgum	12,508	6,995	2,529	580	714	611	337	290	194	258	—
Black cherry	28,632	8,813	5,661	4,814	3,225	3,277	1,434	693	466	249	—
Basswood	22,955	7,760	3,814	5,208	2,937	1,356	1,067	302	229	282	—
Other hardwoods	67,033	27,686	19,227	9,657	4,806	2,718	1,512	686	349	354	38
Total hardwoods	1,096,955	430,797	264,040	167,698	92,862	62,717	36,727	19,584	10,441	11,132	957
All species	1,209,950	474,526	297,061	184,595	103,056	67,254	39,099	20,724	11,064	11,579	992

[a] Includes 80 thousand redcedar trees.

[b] Includes 113,834 thousand white oaks; 36 thousand swamp white oaks; and 236 thousand chinkapin oak trees.

[c] Includes only northern red oak trees.

[d] Includes 124,831 thousand chestnut oaks and 669 thousand post oak trees.

[e] Includes 63,537 thousand black oaks; 39,739 thousand scarlet oaks; 747 thousand pin oaks; and 232 thousand willow oak trees.

Table 14.—*Net volume of timber on commercial forest land, by class of timber, softwoods and hardwoods, West Virginia, 1975*

(In millions of cubic feet)

Class of timber	All species	Softwoods	Hardwoods
Sawtimber trees:			
Sawlog portion	6,581.9	608.8	5,973.1
Upper-stem portion	1,467.2	84.4	1,382.8
All sawtimber trees	8,049.1	693.2	7,355.9
Poletimber trees	5,466.3	301.8	5,164.5
All growing-stock trees	13,515.4	995.0	12,520.4
Rough trees	1,449.6	76.1	1,373.5
Rotten trees	612.7	13.1	599.6
Total, all trees	15,577.7	1,084.2	14,493.5

Table 15.—*Net volume of growing stock and sawtimber on commercial forest land, by ownership classes, stand-size classes, softwoods and hardwoods, West Virginia 1975*

Ownership or stand-size class	Growing stock (million cubic feet)			Sawtimber (million board feet)[a]		
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
BY OWNERSHIP CLASSES						
National Forest	1,886.8	217.8	1,669.0	4,180.9	734.2	3,446.7
Other public	295.0	16.1	278.9	537.6	47.8	489.8
Forest industry	1,178.2	87.8	1,090.4	2,765.6	274.8	2,490.8
Farmer and other	10,155.4	673.3	9,482.1	20,146.7	1,542.9	18,603.8
All ownerships	13,515.4	995.0	12,520.4	27,630.8	2,599.7	25,031.1
BY STAND-SIZE CLASSES						
Sawtimber stands	8,532.5	660.1	7,872.4	21,655.1	2,023.8	19,631.3
Poletimber stands	4,205.3	273.8	3,931.5	4,837.2	435.1	4,402.1
Sapling-seedling stands	766.2	61.1	705.1	1,116.8	140.8	976.0
Nonstocked areas	11.4	—	11.4	21.7	—	21.7
All classes	13,515.4	995.0	12,520.4	27,630.8	2,599.7	25,031.1

[a] International 1/4-inch rule.

Table 16.—*Net volume of growing stock and sawtimber on commercial forest land, by forest types, and softwoods and hardwoods, West Virginia, 1975*

Forest type	Growing stock			Sawtimber		
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
	- - - -*Million cubic feet*- - - -			- - - -*Million board feet*[a]- - - -		
White and red pine	183.2	114.9	68.3	321.4	204.6	116.8
Spruce-fir	151.3	97.2	54.1	461.6	351.5	110.1
Virginia and pitch pine	430.2	277.1	153.1	809.8	595.1	214.7
Oak pine	558.5	192.8	365.7	1,174.2	502.2	672.0
Oak-hickory	7,722.1	137.3	7,584.8	15,379.5	373.5	15,006.0
Elm-ash-cottonwood	764.6	13.3	751.3	1,403.8	41.1	1,362.7
Maple-beech-birch	3,705.5	162.4	3,543.1	8,080.5	531.7	7,548.8
All types	13,515.4	995.0	12,520.4	27,630.8	2,599.7	25,031.1

[a] International 1/4-inch rule.

Table 17.—*Net volume of growing stock on commercial forest land, by species and diameter classes, West Virginia, 1975*

(In millions of cubic feet)

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Virginia pine	416.5	55.7	99.2	100.5	86.8	47.3	20.2	6.8	—	—	—
Other yellow pines	115.1	6.4	23.4	26.9	23.5	17.1	11.7	2.8	3.3	—	—
White pine	125.5	16.4	27.3	12.4	14.0	7.5	5.3	9.8	12.4	13.5	6.9
Red spruce	153.3	4.4	13.7	19.7	30.7	25.2	29.8	15.5	8.6	5.7	—
Hemlock[a]	184.6	31.2	24.1	14.5	20.9	20.1	20.1	18.1	14.6	20.3	.7
Total softwoods	995.0	114.1	187.7	174.0	175.9	117.2	87.1	53.0	38.9	39.5	7.6
Select white oaks[b]	1,293.0	132.0	178.2	201.7	200.3	182.5	140.5	99.0	70.4	68.6	19.8
Select red oaks[c]	1,294.1	84.2	108.6	158.2	151.2	157.5	167.9	132.8	102.7	194.8	36.2
Other white oaks[d]	1,384.7	158.7	187.4	213.8	175.2	182.0	130.2	114.5	83.5	121.1	18.3
Other red oaks[e]	1,427.1	131.4	162.5	177.8	149.9	215.9	177.3	137.3	90.0	153.9	31.1
Red maple	829.9	156.1	168.5	161.7	122.8	93.6	41.7	32.8	11.6	36.6	4.5
Sugar maple	758.6	133.8	133.6	149.4	87.0	77.7	56.3	33.0	19.4	61.0	7.4
Yellow birch	142.5	34.6	35.9	24.0	9.4	3.1	8.0	4.1	7.4	16.0	—
Sweet birch	250.7	71.2	57.7	51.9	24.1	21.9	7.9	5.1	7.4	3.5	—
Hickory	1,173.8	210.5	225.8	222.4	175.8	131.2	89.9	58.7	27.5	30.7	1.3
Beech	612.3	57.2	61.4	77.7	89.3	74.6	94.2	56.7	32.6	58.6	10.0
Ash	282.2	33.8	39.4	29.1	51.3	43.5	37.6	20.7	8.6	16.0	2.2
Black walnut	107.2	11.4	14.3	20.4	15.9	16.6	11.6	6.4	3.4	7.2	—
Yellow-poplar	1,412.8	117.1	157.4	189.0	217.2	236.9	207.3	133.3	71.4	78.2	5.0
Cucumbertree	124.7	11.2	23.2	16.3	26.4	15.4	17.2	8.2	5.8	1.0	—
Blackgum	132.5	24.7	17.0	6.7	13.2	15.4	11.6	13.5	10.7	19.7	—
Black cherry	453.6	33.6	41.6	63.4	68.0	101.3	57.5	35.2	31.7	21.3	—
Basswood	207.5	13.7	18.4	45.0	39.1	22.6	19.0	13.9	11.6	24.2	—
Other hardwoods	633.2	82.0	120.1	107.8	90.4	77.3	58.7	36.0	22.1	32.6	6.2
Total hardwoods	12,520.4	1,497.2	1,751.0	1,916.3	1,706.5	1,669.0	1,334.4	941.2	617.8	945.0	142.0
All species	13,515.4	1,611.3	1,938.7	2,090.3	1,882.4	1,786.2	1,421.5	994.2	656.7	984.5	149.6

[a] Includes 1.8 million cubic feet of redcedar.

[b] Includes 1,289.9 million cubic feet of white oak; 1.0 million of swamp white oak; and 2.1 million of chinkapin oak.

[c] Includes only northern red oak.

[d] Includes 1,379.0 million cubic feet of chestnut oak and 5.7 million of post oak.

[e] Includes 915.5 million cubic feet of black oak; 499.3 million of scarlet oak; 10.6 million of pin oak, 1.7 million of willow oak.

Table 18.—*Net volume of sawtimber on commercial forest land, by species and diameter classes, West Virginia, 1975*

(In millions of board feet)[a]

Species	All classes	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Virginia pine	903.2	304.2	302.3	183.6	83.8	29.3	—	—	—
Other yellow pines	300.2	82.5	81.7	66.3	47.2	10.1	12.4	—	—
White pine	328.8	39.8	50.4	29.3	23.3	43.5	59.8	65.4	17.3
Red spruce	565.2	63.9	119.8	106.5	128.9	73.5	44.4	28.2	—
Hemlock[b]	502.3	44.9	77.5	78.5	71.0	76.3	63.8	87.4	2.9
Total softwoods	2,599.7	535.3	631.7	464.2	354.2	232.7	180.4	181.0	20.2
Select white oaks[c]	2,668.1	—	615.3	611.4	493.5	359.1	260.3	256.9	71.6
Select red oaks[d]	3,203.8	—	438.4	517.9	581.3	468.0	367.8	710.1	120.3
Other white oaks[e]	2,768.6	—	513.7	593.0	442.9	400.4	305.3	444.0	69.3
Other red oaks[f]	3,354.4	—	455.5	732.5	631.0	503.8	334.4	581.8	115.4
Red maple	1,085.9	—	344.1	297.4	140.5	113.8	42.6	130.0	17.5
Sugar maple	1,158.0	—	263.4	255.9	193.9	117.7	72.5	226.5	28.1
Yellow birch	164.8	—	25.1	10.5	31.0	15.0	31.2	52.0	—
Sweet birch	228.2	—	71.4	69.4	25.5	17.5	30.4	14.0	—
Hickory	1,720.6	—	527.7	435.7	317.7	215.2	102.2	117.5	4.6
Beech	1,459.3	—	256.1	247.3	337.4	219.3	130.0	228.9	40.3
Ash	591.0	—	150.7	141.4	129.6	69.2	30.0	60.4	9.7
Black walnut	206.8	—	47.9	55.4	40.7	23.6	12.5	26.7	—
Yellow-poplar	3,267.7	—	651.9	784.1	749.6	496.0	270.9	296.0	19.2
Cucumbertree	247.3	—	79.4	49.6	61.4	30.2	22.9	3.8	—
Blackgum	296.1	—	40.0	51.0	41.0	49.3	38.6	76.2	—
Black cherry	1,112.1	—	203.0	353.7	214.0	131.7	128.5	81.2	—
Basswood	417.5	—	108.7	73.3	64.3	48.4	40.4	82.4	—
Other hardwoods	1,080.9	—	268.7	251.7	207.5	126.1	86.0	119.2	21.7
Total hardwoods	25,031.1	—	5,061.0	5,531.2	4,702.8	3,404.3	2,306.5	3,507.6	517.7
All species	27,630.8	535.3	5,692.7	5,995.4	5,057.0	3,637.0	2,486.9	3,688.6	537.9

[a] International 1/4-inch rule.

[b] Includes 6.6 million board feet of redcedar.

[c] Includes 2,662.0 million board feet of white oak; 3.4 million of swamp white oak; and 2.7 million of chinkapin oak.

[d] Includes only northern red oak.

[e] Includes 2,761.0 million board feet of chestnut oak and 7.6 million of post oak.

[f] Includes 2,221.1 million board feet of black oak; 1,102.4 million of scarlet oak; and 30.9 million of pin oak.

Table 19.—*Net volume of sawtimber on commercial forest land, by species and quality classes, West Virginia, 1975*

(In millions of board feet)[a]

Species	All classes	Standard-lumber logs			
		Grade 1	Grade 2	Grade 3	Grade 4[b]
Softwoods:					
White pine	328.8	22.1	68.7	185.0	53.0
Virginia pine	903.2	16.5	27.1	859.6	—
Other yellow pines	300.2	18.2	21.7	260.3	—
Other softwoods[c]	1,067.5	—	—	—	—
Total softwoods	2,599.7	56.8	117.5	1,304.9	53.0
Hardwoods:					
Select white oaks	2,668.1	182.0	431.1	1,370.6	684.4
Select red oaks	3,203.8	742.4	706.0	1,341.3	414.1
Other white oaks	2,768.6	297.3	518.6	1,289.8	662.9
Other red oaks	3,354.4	495.4	533.1	1,434.1	891.8
Red maple	1,085.9	123.6	145.7	545.8	270.8
Sugar maple	1,158.0	144.3	187.9	545.2	280.6
Yellow birch	164.8	25.5	28.6	76.5	34.2
Sweet birch	228.2	26.6	44.7	114.5	42.4
Hickory	1,720.6	161.0	237.3	799.2	523.1
Beech	1,459.3	120.7	193.2	691.3	454.1
Ash	591.0	79.2	137.7	261.4	112.7
Black walnut	206.8	5.2	27.5	131.4	42.7
Yellow-poplar	3,267.7	658.8	600.0	1,337.3	671.6
Cucumbertree	247.3	23.2	47.5	125.0	51.6
Blackgum	296.1	54.7	76.7	125.9	38.8
Black cherry	1,112.1	169.7	218.9	483.8	239.7
Basswood	417.5	57.1	95.7	203.3	61.4
Other hardwoods	1,080.9	65.8	149.8	619.6	245.7
Total hardwoods	25,031.1	3,432.5	4,380.0	11,496.0	5,722.6
	- - - - - -	- - - - - -	*Percent*	- - - - - -	- - - - - -
Hardwood quality	100	14	17	46	23

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[a] International 1/4-inch rule.

[b] Grade 4 applies only to white pine. For hardwoods the volumes in this column are for construction logs.

[c] Species other than pine are not graded into standard-lumber grades.

Table 20.—*Components of average annual change of growing stock and sawtimber on commercial forest land, West Virginia 1960-74*

Components	Growing stock	Saw-timber
	Thousand cubic feet	*Thousand board feet*[b]
Growth on initial inventory[a]	232,800	372,000
Ingrowth—trees entering the volume class	178,100	448,100
Gross growth	410,900	820,100
Cull increment	– 53,900	– 80,300
Annual mortality	– 49,200	– 76,200
Average annual net growth	307,800	663,600
Average annual removals	– 119,300	– 257,000
Average annual change	188,500	406,600

[a] Including growth on trees that were subsequently cut.
[b] International 1/4-inch rule.

Table 21.—*Current annual net growth, removals, and mortality of growing stock and sawtimber on commercial forest land, by species, West Virginia, 1974*[a]

Species	Growing stock			Sawtimber		
	Annual net growth	Annual timber removals	Annual mortality	Annual net growth	Annual timber removals	Annual mortality
	– – –*Thousand cubic feet*– – –			– – –*Thousand board feet* [b]– – –		
Softwoods:						
Virginia pine	31,400	3,000	3,500	96,800	3,500	8,400
White pine	10,400	—	700	33,600	—	—
Other softwoods	16,800	7,600	4,400	41,600	24,300	6,100
Total	58,600	10,600	8,600	172,000	27,800	14,500
Hardwoods:						
Select white oaks	46,300	17,400	4,700	75,000	45,100	10,200
Select red oaks	54,700	19,400	4,200	108,300	51,300	5,900
Other white oaks	27,100	10,100	8,100	42,500	26,000	19,600
Other red oaks	33,000	18,100	7,800	61,200	48,300	17,900
Maples	73,300	12,900	2,700	79,800	33,000	2,800
Hickory	18,400	11,800	7,000	21,500	30,400	10,800
Beech	12,600	19,800	1,900	21,700	51,700	4,700
Ash, black cherry & walnut	39,700	3,500	4,200	62,100	8,800	2,900
Yellow-poplar	78,100	27,600	2,100	138,700	72,600	3,000
Other hardwoods	31,700	14,900	12,800	40,200	38,100	6,800
Total hardwoods	414,900	155,500	55,500	651,000	405,300	84,600
Total, all species	473,500	166,100	64,100	823,000	433,100	99,100

[a] Based on the trend between inventories.
[b] International 1/4-inch log rule.

Table 22.—*Current annual net growth and removals of growing stock and sawtimber on commercial forest land, by ownership classes, softwoods and hardwoods, West Virginia, 1974*

Ownership	Annual net growth			Annual timber removals		
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
			GROWING STOCK *Thousand cubic feet*			
National Forest	59,100	4,600	54,500	14,900	800	14,100
Other public	10,000	1,000	9,000	—	—	—
Forest industry	39,900	6,600	33,300	19,900	4,200	15,700
Farmer and other	364,500	46,400	318,100	131,300	5,600	125,700
All ownerships	473,500	58,600	414,900	166,100	10,600	155,500
			SAWTIMBER *Thousand board feet* [a]			
National Forest	127,000	19,400	107,600	44,800	2,300	42,500
Other public	16,900	4,400	12,500	—	—	—
Forest industry	77,900	23,400	54,500	68,300	15,800	52,500
Farmer and other	601,200	124,800	476,400	320,000	9,700	310,300
All ownerships	823,000	172,000	651,000	433,100	27,800	405,300

[a] International 1/4-inch rule.

Table 23.—*Current annual mortality of growing stock and sawtimber on commercial forest land, softwoods and hardwoods, West Virginia 1974*

Ownership and cause	Growing stock (thousand cubic feet)			Sawtimber (thousand board feet)[a]		
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
			BY OWNERSHIP			
National Forest	6,400	800	5,600	11,800	2,500	9,300
Other public	1,400	200	1,200	1,800	300	1,500
Forest industry	5,700	900	4,800	10,800	1,900	8,900
Farmer and other	50,600	6,700	43,900	74,700	9,800	64,900
All ownerships	64,100	8,600	55,500	99,100	14,500	84,600
			BY CAUSE			
Fire	1,900	—	1,900	5,100	—	5,100
Insects	600	100	500	400	400	—
Disease	14,400	1,900	12,500	20,900	1,300	19,600
Weather	3,700	100	3,600	9,200	—	9,200
Other	3,600	500	3,100	5,400	500	4,900
Unknown	39,900	6,000	33,900	58,100	12,300	45,800
All causes	64,100	8,600	55,500	99,100	14,500	84,600

[a] International 1/4-inch rule.

Table 24.—*Sampling errors for major forest area and timber-volume classes, West Virginia, 1975*

(In percent)

Table no.	Item classification	Sampling error	
	FOREST AREA		
1	Forest-land area:		
	Commercial	1.0	
	Unproductive	35.0	
	Total	1.0	
2	Ownership:[a]		
	Forest industry	10	
	Farmer-owned	8	
	Misc. private	2	
	Farmer and other	2	
3	Stand-size class:		
	Sawtimber	3	
	Poletimber	4	
	Sapling-seedling	6	
	Nonstocked areas	28	
4	Stand-volume per acre (board feet):		
	Less than 1,500	4	
	1,500 to 5,000	3	
	More than 5,000	6	
6	Area-condition class:		
	10-40	*	
	50	7	
	60	3	
	70	6	
7	Growth-per-acre class (cubic feet):		
	120 to 165	11	
	85 to 120	5	
	50 to 85	4	
	Less than 50	6	
8	Forest type:		
	White-red pine	32	
	Spruce-fir	*	
	Virginia and pitch pine	12	
	Oak-pine	13	
	Oak-hickory	3	
	Elm-ash-cottonwood	11	
	Maple-beech-birch	6	
	Aspen-birch	*	
	TIMBER VOLUME		
		Growing stock	*Saw timber*
14	Class of timber:		
	Sawtimber trees	2	—
	Poletimber trees	2	—
	All growing stock	2	—
	Rough trees	4	—
	Rotten trees	4	—
	All live trees	2	—

Table no.	Item classification	Sampling error	
		Growing stock	*Sawtimber*
15	Ownership and stand-size:		
	National Forest	5	8
	Other public	20	24
	Forest industry	11	13
	Farm and other	2	3
	Sawtimber stands	4	4
	Poletimber stands	5	6
	Sapling-seedling	7	10
	Nonstocked areas	43	*
16	Forest type:		
	White and red pine	35	37
	Spruce-fir	*	*
	Virginia and pitch pine	13	18
	Oak-pine	17	19
	Oak-hickory	3	4
	Elm-ash-cottonwood	13	15
	Maple-beech-birch	7	8
17-18	Diameter classes (inches):		
	5.0-6.9	3	—
	7.0-8.9	3	—
	9.0-10.9[b]	3	12
	11.0-12.9	3	3
	13.0-14.9	3	3
	15.0-16.9	4	4
	17.0-18.9	4	5
	19.0-20.9	5	6
	21.0-28.9	5	6
	29.0 and larger	12	13
17-18	Species:		
	White pine	30	24
	Virginia pine	9	12
	Pitch pine	19	20
	Other yellow pines	26	26
	Red spruce	31	29
	Hemlock	20	20
	Select white oaks	6	2
	Select red oaks	6	7
	Other white oaks	6	7
	Other red oaks	5	6
	Red maple	6	9
	Sugar maple	8	10
	Yellow birch	14	23
	Sweet birch	11	15
	Hickory	5	8
	Beech	9	11
	Ash	10	12
	Black walnut	13	19
	Yellow-poplar	6	8
	Cucumbertree	11	16
	Blackgum	12	16

Continued

Table 24.—Continued

Table no.	Item classification	Sampling error	
		Growing stock	*Sawtimber*
	Black cherry	11	14
	Basswood	17	20
	Other hardwoods	7	11
	All softwoods	8	9
	All hardwoods	2	3
	All species	1.7	2.4
22	Growth by:		
	National Forest	15	11
	Other public	*	**
	Forest industry	26	31
	Farm and other	11	12
	Softwoods	46	40
	Hardwoods	8	11
	All species	8	11
22	Removals by:		
	National Forest	10	27
	Other public	—	—
	Forest industry	*	*
	Farmer and other	16	19
	Softwoods	*	*
	Hardwoods	15	18
	All species	15	19
	MORTALITY		
23	By ownership:		
	National Forest	15	22
	Other public	*	*
	Forest industry	41	*
	Farmer and other	11	20
	Softwoods	36	*
	Hardwoods	9	19
	All species	9	19
23	By cause:		
	Fire	*	*
	Insect	*	*
	Disease	19	34
	Weather	37	*
	Suppression	48	*
	Unknown	13	26

*Sampling errors of 50 to 99 percent.

** Sampling errors of over 100 percent.

[a] Some classifications have no sampling errors and some less important classifications have been omitted.

[b] Board-foot sampling error for this class is for softwoods only.

Table 25.—*Output of timber products, by source of material, softwoods and hardwoods, West Virginia, 1974*

Product and species group	Standard units	Total output		Output from roundwood		Output from plant byproducts	
		Number of units	Thousand cubic feet	Number of units	Thousand cubic feet	Number of units	Thousand cubic feet
Sawlogs:							
Softwood	M bd ft[a]	17,276	2,887	17,276	2,887	—	—
Hardwood	M bd ft	446,421	69,355	446,421	69,355	—	—
Total	M bd ft	463,697	72,242	463,697	72,242	—	—
Veneer logs and bolts:							
Softwood	M bd ft	—	—	—	—	—	—
Hardwood	M bd ft	3,163	491	3,163	491	—	—
Total	M bd ft	3,163	491	3,163	491	—	—
Pulpwood:							
Softwood	Std cords[b]	54,500	4,632	50,800	4,318	3,700	314
Hardwood	Std cords	357,600	30,396	162,800	13,838	194,800	16,558
Total	Std cords	412,100	35,028	213,600	18,156	198,500	16,872
Cooperage logs and bolts:							
Softwood	M bd ft	—	—	—	—	—	—
Hardwood	M bd ft	3,167	492	3,167	492	—	—
Total	M bd ft	3,167	492	3,167	492	—	—
Poles:							
Softwood	M pieces	1	12	1	12	—	—
Hardwood	M pieces	—	—	—	—	—	—
Total	M pieces	1	12	1	12	—	—

Posts (round and split):							
Softwood	M pieces	96	190	96	190	—	—
Hardwood	M pieces	1,382	1,943	1,382	1,943	—	—
Total	M pieces	1,478	2,133	1,478	2,133	—	—
Mine timbers (round):							
Softwood	M ft^3	550	550	550	550	—	—
Hardwood	M ft^3	6,192	6,192	6,192	6,192	—	—
Total	M ft^3	6,742	6,742	6,742	6,742	—	—
Other:[c]							
Softwood	M ft^3	4,578	4,578	3,682	3,682	896	896
Hardwood	M ft^3	7,047	7,047	2,661	2,661	4,386	4,386
Total	M ft^3	11,625	11,625	6,343	6,343	5,282	5,282
Total industrial products:							
Softwood	M ft^3		12,849		11,639		1,210
Hardwood	M ft^3		115,916		94,972		20,944
Total	M ft^3		128,765		106,611		22,154
Fuelwood:							
Softwood	Std cords[d]	5,548	444	1,786	143	3,762	301
Hardwood	Std cords	87,218	6,977	36,268	2,901	50,950	4,076
Total	Std cords	92,766	7,421	38,054	3,044	54,712	4,377
All products:[e]							
Softwood	M ft^3		13,293		11,782		1,511
Hardwood	M ft^3		122,893		97,873		25,020
Total	M ft^3		136,186		109,655		26,531

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[a] International 1/4-inch rule.

[b] Rough wood basis, includes chips converted to equivalent standard cords, 85 ft^3 of solid wood.

[c] Includes metallurgical chips, charcoal wood, handle stock, dimension, and fence rails.

[d] Rough wood basis, includes chips converted to equivalent standard cords, 80 ft^3 of solid wood.

[e] Does not include 63,000 cubic feet of softwood and 777,000 cubic feet of hardwood residues used for agricultural bedding.

Table 26.—*Output of roundwood products, by source, softwoods and hardwoods, West Virginia, 1974*

(In thousands of cubic feet)

Product and species group	All sources	Growing-stock trees[a]			Rough and rotten trees[a]	Salvable dead trees[a]	Other sources[b]
		Total	Sawtimber	Poletimber			
			PRINCIPAL INDUSTRIAL PRODUCTS				
Sawlogs:							
Softwood	2,887	2,548	2,548	—	—	178	161
Hardwood	69,355	66,505	64,790	1,715	21	1,120	1,709
Total	72,242	69,053	67,338	1,715	21	1,298	1,870
Veneer logs and bolts:							
Softwood	—	—	—	—	—	—	—
Hardwood	491	491	486	5	—	—	—
Total	491	491	486	5	—	—	—
Pulpwood:							
Softwood	4,318	3,242	1,889	1,353	—	648	428
Hardwood	13,838	12,555	5,249	7,306	—	325	958
Total	18,156	15,797	7,138	8,659	—	973	1,386
			MISCELLANEOUS INDUSTRIAL PRODUCTS				
Cooperage logs and bolts:							
Softwood	—	—	—	—	—	—	—
Hardwood	492	492	487	5	—	—	—
Total	492	492	487	5	—	—	—
Piling:							
Softwood	—	—	—	—	—	—	—
Hardwood	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—
Poles:							
Softwood	12	11	9	2	—	—	1
Hardwood	—	—	—	—	—	—	—
Total	12	11	9	2	—	—	1

Posts (round and split):							
Softwood	190	86	63	23	—	99	5
Hardwood	1,943	1,278	409	869	646	—	19
Total	2,133	1,364	472	892	646	99	24
Mine timbers (round):							
Softwood	550	550	434	116	—	—	—
Hardwood	6,192	6,068	3,459	2,609	37	56	31
Total	6,742	6,618	3,893	2,725	37	56	31
Other:							
Softwood	3,682	1,676	1,224	452	—	1,905	101
Hardwood	2,661	2,414	1,009	1,405	—	63	184
Total	6,343	4,090	2,233	1,857	—	1,968	285
			TOTAL INDUSTRIAL PRODUCTS				
Softwood	11,639	8,113	6,167	1,946	—	2,830	696
Hardwood	94,972	89,803	75,889	13,914	704	1,564	2,901
Total	106,611	97,916	82,056	15,860	704	4,394	3,597
			NONINDUSTRIAL PRODUCTS				
Fuelwood:							
Softwood	143	72	52	20	—	13	58
Hardwood	2,901	1,471	732	739	446	412	572
Total	3,044	1,543	784	759	446	425	630
			ALL PRODUCTS				
Softwood	11,782	8,185	6,219	1,966	—	2,843	754
Hardwood	97,873	91,274	76,621	14,653	1,150	1,976	3,473
Total	109,655	99,459	82,840	16,619	1,150	4,819	4,227

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[a] On commercial forest land.

[b] Includes trees less than 5.0 inches in diameter, tree tops and limbs from commercial forest areas, or any material from noncommercial forest land or nonforest land such as fence rows and suburban areas.

Table 27.—*Timber removals from growing stock and sawtimber on commercial forest land, by items, softwoods and hardwoods, West Virginia, 1974*

Item	Growing stock			Sawtimber		
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
	Thousand cubic feet			*Thousand board feet*[a]		
Roundwood products:						
Sawlogs	69,053	2,548	66,505	312,626	11,706	300,920
Veneer logs and bolts	491	—	491	2,717	—	2,717
Pulpwood	15,797	3,242	12,555	20,528	6,148	14,380
Cooperage logs and bolts	492	—	492	2,723	—	2,723
Piling	—	—	—	—	—	—
Poles	11	11	—	37	37	—
Posts	1,364	86	1,278	2,170	259	1,911
Mine timbers	6,618	550	6,068	17,918	1,760	16,158
Other	4,090	1,676	2,414	9,740	5,026	4,714
Fuelwood	1,543	72	1,471	2,174	169	2,005
All products	99,459	8,185	91,274	370,633	25,105	345,528
Logging residues	40,873	1,505	39,368	27,901	1,550	26,351
Other removals	25,775	914	24,861	34,527	1,138	33,389
Total removals	166,107	10,604	155,503	433,061	27,793	405,268

[a] International 1/4-inch rule.

Table 28.—*Volume of unused residues at primary manufacturing plants, by industry and type of residue, and softwoods and hardwoods, West Virginia, 1974*

(In thousands of cubic feet)

Species group and type of residue	All industries	Lumber	Veneer and plywood	Other
Softwoods:				
Coarse[a]	118	113	—	5
Fine[b]	270	267	—	3
Total	388	380	—	8
Hardwoods:				
Coarse[a]	3,765	3,584	12	169
Fine[b]	4,534	4,480	5	49
Total	8,299	8,064	17	218
All species:				
Coarse[a]	3,883	3,697	12	174
Fine[b]	4,804	4,747	5	52
Total	8,687	8,444	17	226

[a] Material such as slabs, edgings, and veneer cores.

[b] Material such as sawdust and shavings.

Table 29.—*Projection of annual net growth, timber removals, and inventory of growing stock and sawtimber on commercial forest land in West Virginia, 1975-2005*[a]

Species group	1975 (inventory year)	1985	1995	2005
		GROWING STOCK *Million cubic feet*		
Softwoods:				
Removals	10.6	40.5	69.9	80.9
Growth	58.6	69.3	78.2	80.8
Inventory	995.0	1,322.0	1,530.6	1,594.1
Hardwoods:				
Removals	155.5	295.4	375.8	436.8
Growth	414.9	395.7	426.4	437.8
Inventory	12,520.4	13,907.0	14,636.2	14,869.4
Total:				
Removals	166.1	335.9	445.7	517.7
Growth	473.5	465.0	504.6	518.6
Inventory	13,515.4	15,229.0	16,166.8	16,463.5
		SAWTIMBER *Million board feet*[b]		
Softwoods:				
Removals	27.8	143.0	230.0	294.0
Growth	172.0	235.0	272.0	284.0
Inventory	2,599.7	3,744.0	4,391.0	4,529.0
Hardwoods:				
Removals	405.3	605.0	759.0	882.0
Growth	651.0	756.0	805.0	830.0
Inventory	25,031.1	27,213.0	28,136.0	28,053.0
Total:				
Removals	433.1	748.0	989.0	1,176.0
Growth	823.0	991.0	1,077.0	1,114.0
Inventory	27,630.8	30,957.0	32,527.0	32,582.0

[a] Based upon the following assumptions: (1) the area of commercial forest will increase at a constant rate of 0.25 percent per year; and (2) total growing-stock growth and removals will be in balance at 3.1 percent of the inventory at the end of 30 years.

[b] International 1/4-inch rule.

Table 30.—*Projection of annual net growth, timber removals, and inventory of growing stock and sawtimber on commercial forest land in West Virginia, 1975-2005*[a]

Species group	1975 (inventory year)	1985	1995	2005
		GROWING STOCK *Million cubic feet*		
Softwoods:				
Removals	10.6	15.8	23.1	32.0
Growth	58.6	77.8	100.5	120.0
Inventory	995.0	1,541.9	2,249.2	3,087.3
Hardwoods:				
Removals	155.5	187.0	229.6	281.8
Growth	414.9	499.0	612.6	752.0
Inventory	12,520.4	15,370.1	18,868.4	23,162.9
Total:				
Removals	166.1	202.8	252.7	313.8
Growth	473.5	576.8	713.1	872.0
Inventory	13,515.4	16,912.0	21,117.6	26,250.2
		SAWTIMBER *Million board feet*[b]		
Softwoods:				
Removals	27.8	53.3	83.5	123.5
Growth	172.0	250.8	349.4	442.4
Inventory	2,599.7	4,390.0	6,826.6	9,921.6
Hardwoods:				
Removals	405.3	360.0	416.9	489.7
Growth	651.0	718.1	829.0	984.0
Inventory	25,031.1	26,392.0	30,193.6	34,764.0
Total:				
Removals	433.1	413.3	500.4	613.2
Growth	823.0	968.9	1,178.4	1,426.4
Inventory	27,630.8	30,782.0	37,020.2	44,685.6

[a] Based upon the following assumptions: (1) total area of commercial forest land will increase approximately 300,000 acres in each decade; (2) growth rates based upon the average annual net growth between 1959 and 1974 will hold for the next 30 years; (3) there will be no major increase in the level of forest management or timber utilization during the next 30 years.

[b] International 1/4-inch rule.

Table 31.—*Land area of West Virginia, by land classes and geographic units, 1975*

(In thousands of acres)

Land class	Northeastern	Southern	Northwestern	Total
Commercial	4,405.2	3,913.2	3,165.3	11,483.7
Productive-reserved	86.9	20.6	8.0	115.5
Christmas tree plantation	8.9	—	—	8.9
Unproductive	23.5	1.0	—	24.5
Total forest land	4,524.5	3,934.8	3,173.3	11,632.6
Nonforest land	1,412.6	1,089.4	1,279.2	3,781.2
All land	5,937.1	5,024.2	4,452.5	15,413.8

Table 32.—*Area of commercial forest land in West Virginia, by ownership classes and geographic units, 1975*

(In thousands of acres)

Ownership classes	Northeastern	Southern	Northwestern	Total
National Forest	733.8	138.8	—	872.6
Other federal	14.0	3.1	22.0	39.1
State	88.1	78.7	62.1	228.9
County and municipal	.2	—	—	.2
Total public	836.1	220.6	84.1	1,140.8
Forest industry	234.5	491.5	153.7	879.7
Farmer-owned	876.0	391.5	660.1	1,927.6
Miscellaneous private:				
Individual	1,634.4	1,289.6	1,863.8	4,787.8
Corporate	402.8	1,254.1	95.4	1,752.3
Other	421.4	265.9	308.2	995.5
Total private	3,569.1	3,692.6	3,081.2	10,342.9
All ownerships	4,405.2	3,913.2	3,165.3	11,483.7

Table 33.—*Area of commercial forest land in West Virginia, by stand-size classes and geographic units, 1975*

(In thousands of acres)

Stand-size class	Northeastern	Southern	Northwestern	Total
Sawtimber stands	1,785.9	1,923.9	1,365.9	5,075.7
Poletimber stands	1,682.2	1,280.4	997.0	3,959.6
Sapling-seedling stands	852.4	662.0	791.7	2,306.1
Nonstocked areas	84.7	46.9	10.7	142.3
All classes	4,405.2	3.913.2	3,165.3	11,483.7

Table 34.—*Area of commercial forest in West Virginia, by forest types and geographic units, 1975*

(In thousands of acres)

Forest type	Northeastern	Southern	Northwestern	Total
White and red pine	31.3	69.9	—	101.2
Spruce-fir	58.5	.5	—	59.0
Virginia and pitch pine	187.5	48.2	249.5	485.2
Oak-pine	264.5	93.2	210.5	568.2
Oak-hickory	2,337.0	2,506.0	1,985.1	6,828.1
Elm-ash-cottonwood	392.2	156.6	265.7	814.5
Maple-beech-birch	1,125.3	1,038.8	454.5	2,618.6
Aspen-birch	8.9	—	—	8.9
All types	4,405.2	3,913.2	3,165.3	11,483.7

Table 35.—*Number of growing-stock trees and rough and rotton trees on commercial forest land in West Virginia, by diameter-class groups, softwoods and hardwoods, and geographic units, 1975*

(In thousands of trees)

Diameter-class group (in inches)	Northeastern	Southern	Northwestern	Total
	GROWING STOCK TREES			
Softwoods:				
5.0 to 8.9	32,187	17,172	27,391	76,750
9.0 to 18.9	14,807	6,369	13,964	35,140
19.0 and larger	668	404	33	1,105
Total	47,662	23,945	41,388	112,995
Hardwoods:				
5.0 to 10.9	331,949	300,076	230,510	862,535
11.0 to 18.9	84,056	74,831	53,003	211,890
19.0 and larger	7,821	8,828	5,881	22,530
Total	423,826	383,735	289,394	1,096,955
All species	471,488	407,680	330,782	1,209,950
	ROUGH AND ROTTEN TREES			
Softwoods:				
5.0 to 8.9	6,281	4,269	1,166	11,716
9.0 to 18.9	1,590	1,855	569	4,014
19.0 and larger	50	38	—	88
Total	7,921	6,162	1,735	15,818
Hardwoods:				
5.0 to 10.9	119,504	112,743	57,620	289,867
11.0 to 18.9	22,808	18,907	7,583	49,298
19.0 and larger	4,064	4,762	1,726	10,552
Total	146,376	136,412	66,929	349,717
All species	154,297	142,574	68,664	365,535

Table 36.—*Number of growing-stock trees on commercial forest land, by species and diameter classes, Northeastern Unit, West Virginia, 1975*

(In thousands of trees)

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Virginia pine	18,672	9,200	5,849	2,029	1,123	296	125	50	—	—	—
Other yellow pines	8,786	1,962	3,530	1,835	811	499	106	21	22	—	—
White pine	5,193	1,413	2,137	722	353	186	55	102	112	83	30
Red spruce	7,087	1,017	1,518	1,432	1,371	685	654	244	110	56	—
Hemlock[a]	7,924	3,707	1,854	684	554	401	247	222	149	101	5
Total softwoods	47,662	17,299	14,888	6,702	4,212	2,067	1,187	639	393	240	35
Select white oaks[b]	30,698	11,050	7,048	4,970	3,474	2,102	1,029	488	300	197	40
Select red oaks[c]	39,098	13,023	7,443	6,488	4,233	2,672	2,088	1,313	806	928	104
Other white oaks[d]	58,249	21,097	13,717	10,642	5,135	3,570	1,661	1,258	545	569	55
Other red oaks[e]	30,971	12,585	8,270	4,307	2,020	1,549	1,072	529	243	337	59
Red maple	50,421	21,237	14,325	6,981	4,910	1,830	561	315	77	176	9
Sugar maple	32,494	13,428	8,311	5,798	2,271	1,282	807	268	62	261	6
Yellow birch	12,720	6,431	3,721	1,603	343	83	218	51	122	148	—
Sweet birch	18,863	10,022	4,479	2,320	884	786	252	55	65	—	—
Hickory	34,206	12,402	10,147	6,283	3,142	1,231	519	257	91	125	9
Beech	18,292	6,120	3,958	2,996	2,133	1,213	892	527	195	258	—
Ash	8,857	3,264	2,405	1,012	899	575	397	200	60	45	—
Black walnut	2,151	633	860	263	49	221	98	—	—	27	—
Yellow-poplar	33,303	10,525	7,570	5,411	3,461	2,824	1,972	818	365	341	16
Cucumbertree	2,804	1,168	619	329	343	163	132	27	11	12	—
Blackgum	5,352	3,088	1,241	215	376	95	109	77	112	39	—
Black cherry	19,068	5,154	3,703	3,576	2,250	2,333	1,026	528	355	143	—
Basswood	6,477	1,285	1,441	1,740	940	451	260	113	106	141	—
Other hardwoods	19,802	6,878	4,571	3,796	1,961	1,358	666	311	65	172	24
Total hardwoods	423,826	159,390	103,829	68,730	38,824	24,338	13,759	7,135	3,580	3,919	322
All species	471,488	176,689	118,717	75,432	43,036	26,405	14,946	7,774	3,973	4,159	357

[a] Includes 20 thousand redcedar trees.

[b] Includes 30,588 thousand white oaks and 110 thousand chinkapin oak trees.

[c] Includes only northern red oak trees.

[d] Includes 58,057 thousand chestnut oaks and 192 thousand post oak trees.

[e] Includes 17,004 thousand black oaks; 13,812 thousand scarlet oaks, and 155 thousand willow oak trees.

Table 37.—Number of growing-stock trees on commercial forest land, by species and diameter classes, Southern Unit, West Virginia, 1975

(In thousands of trees)

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0–18.9	19.0-20.9	21.0-28.9	29.0+
Virginia pine	7,097	3,666	1,895	937	394	128	53	24	—	—	—
Other yellow pines	1,979	668	574	325	266	—	121	4	21	—	—
White pines	5,088	2,119	1,704	365	446	121	94	120	68	51	—
Red spruce	605	64	95	125	108	100	59	36	13	5	—
Hemlock	9,176	4,374	2,013	802	763	460	319	199	112	134	—
Total softwoods	23,945	10,891	6,281	2,554	1,977	809	646	383	214	190	—
Select white oaks[a]	37,795	15,291	9,110	5,181	3,397	1,923	1,384	794	377	309	29
Select red oaks[b]	25,304	5,667	5,941	4,743	2,665	2,261	1,678	929	617	737	56
Other white oaks[c]	44,439	20,605	9,738	5,163	2,853	2,322	1,355	933	657	738	75
Other red oaks[d]	43,700	15,216	9,867	6,615	3,346	3,801	1,897	1,195	808	884	71
Red maple	29,257	13,673	8,178	4,143	1,178	1,208	378	263	66	148	22
Sugar maple	22,279	10,441	5,827	3,070	1,168	824	300	211	177	229	32
Yellow birch	5,116	2,717	1,362	576	248	46	56	53	21	37	—
Sweet birch	14,460	8,211	3,262	2,060	517	208	12	61	83	46	—
Hickory	41,995	16,682	10,824	6,504	3,799	1,899	1,218	664	229	176	—
Beech	18,440	7,879	3,521	2,466	1,866	1,098	892	264	174	232	48
Ash	6,306	2,807	718	796	938	651	252	74	4	54	12
Black walnut	2,031	695	268	600	197	35	102	78	19	37	—
Yellow-poplar	43,850	13,366	9,450	7,415	5,131	3,931	2,355	1,258	555	382	7
Cucumbertree	6,832	1,903	2,428	909	773	362	301	87	69	—	—
Blackgum	4,447	2,396	819	299	93	317	166	128	63	166	—
Black cherry	5,249	2,433	825	612	502	450	240	75	56	56	—
Basswood	13,043	5,498	1,914	2,498	1,375	744	777	71	84	82	—
Other hardwoods	19,192	7,944	6,324	2,616	1,088	678	329	109	11	93	—
Total hardwoods	383,735	153,434	90,376	56,266	31,134	22,758	13,692	7,247	4,070	4,406	352
All species	407,680	164,325	96,657	58,820	33,111	23,567	14,338	7,630	4,284	4,596	352

[a] Includes only white oak trees.

[b] Includes only northern red oak trees.

[c] Includes only chestnut oak trees.

[d] Includes 27,141 thousand black oaks; 15,812 thousand scarlet oaks, and 747 thousand pin oak trees.

Table 38.—*Number of growing-stock trees on commercial forest land, by species and diameter classes, Northwestern Unit, West Virginia, 1975*

(In thousands of trees)

Species	All classes	Diameter class (inches at breast height) 5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 +
Virginia pine	38,875	14,708	11,370	7,100	3,638	1,545	421	93	—	—	—
Other yellow pines	2,420	831	482	541	307	116	118	25	—	—	—
White pine	33	—	—	—	—	—	—	—	16	17	—
Redcedar	60	—	—	—	60	—	—	—	—	—	—
Total softwoods	41,388	15,539	11,852	7,641	4,005	1,661	539	118	16	17	—
Select white oaks[a]	45,613	15,809	12,162	8,072	4,022	2,687	1,340	724	452	292	53
Select red oaks[b]	11,590	3,591	1,908	1,832	1,086	911	808	491	311	569	83
Other white oaks[c]	22,812	5,901	6,452	4,092	2,307	1,758	951	519	411	393	28
Other red oaks[d]	29,584	8,406	6,175	4,797	2,885	2,971	1,961	1,198	483	631	77
Red maple	15,305	9,771	2,680	1,782	404	340	203	65	48	12	—
Sugar maple	19,540	8,154	3,963	4,018	1,454	953	485	229	92	185	7
Sweet birch	1,886	974	762	150	—	—	—	—	—	—	—
Hickory	50,575	28,853	11,913	5,592	1,966	1,402	509	211	89	40	—
Beech	7,981	2,092	1,743	1,504	853	484	662	297	175	165	6
Ash	12,172	5,487	3,599	860	1,059	454	416	136	76	85	—
Black walnut	6,427	2,757	1,287	1,071	669	406	124	44	40	29	—
Yellow-poplar	26,093	9,398	6,314	3,793	2,830	1,679	1,014	685	210	155	15
Cucumbertree	1,318	202	484	232	272	40	26	44	18	—	—
Black gum	2,709	1,511	469	66	245	199	62	85	19	53	—
Black cherry	4,315	1,226	1,133	626	473	494	168	90	55	50	—
Basswood	3,435	977	459	970	622	161	30	118	39	59	—
Other hardwoods	28,039	12,864	8,332	3,245	1,757	682	517	266	273	89	14
Total hardwoods	289,394	117,973	69,835	42,702	22,904	15,621	9,276	5,202	2,791	2,807	283
All species	330,782	133,512	81,687	50,343	26,909	17,282	9,815	5,320	2,807	2,824	283

[a] Includes 45,451 thousand white oaks; 36 thousand swamp white oaks, and 126 thousand chinkapin oak trees.
[b] Includes only northern red oak trees.
[c] Includes 22,335 thousand chestnut oaks and 477 thousand post oak trees.
[d] Includes 19,392 thousand black oaks; 10,115 thousand scarlet oaks; and 77 thousand willow oak trees.

Table 39.—*Net volume of timber on commercial forest land in West Virginia, by class of timber and geographic units, 1975*

(In millions of cubic feet)

Class of timber	Northeastern	Southern	Northwestern	Total
Sawtimber trees:				
Sawlog portion	2,629.6	2,292.9	1,659.4	6,581.9
Upper-stem portion	595.3	505.7	366.2	1,467.2
All sawtimber trees	3,224.9	2,798.6	2,025.6	8,049.1
Poletimber trees	2,284.1	1,757.9	1,424.3	5,466.3
All growing-stock trees	5,509.0	4,556.5	3,449.9	13,515.4
Rough trees	717.6	486.1	245.9	1,449.6
Rotten trees	301.2	192.0	119.5	612.7
Total, all trees	6,527.8	5,234.6	3,815.3	15,577.7

Table 40.—*Net volume of growing stock on commercial forest land in West Virginia, by ownership classes, softwoods and hardwoods, and geographic units, 1975*

(In millions of cubic feet)

Ownership class and species group	Northeastern	Southern	Northwestern	Total
National Forest:				
Softwoods	185.7	32.1	—	217.8
Hardwoods	1,382.2	286.8	—	1,669.0
Total	1,567.9	318.9	—	1,886.8
Other public:				
Softwoods	5.7	3.5	6.9	16.1
Hardwoods	138.9	63.9	76.1	278.9
Total	144.6	67.4	83.0	295.0
Forest industry:				
Softwoods	37.7	14.5	35.6	87.8
Hardwoods	309.6	606.8	174.0	1,090.4
Total	347.3	621.3	209.6	1,178.2
Other private:				
Softwoods	249.7	159.0	264.6	673.3
Hardwoods	3,199.5	3,389.9	2,892.7	9,482.1
Total	3,449.2	3,548.9	3,157.3	10,155.4
All ownerships:				
Softwoods	478.8	209.1	307.1	995.0
Hardwoods	5,030.2	4,347.4	3,142.8	12,520.4
Total	5,509.0	4,556.5	3,449.9	13,515.4

Table 41.—*Net volume of sawtimber on commercial forest land in West Virginia, by ownership classes, softwoods and hardwoods, and geographic units, 1975*

(In millions of board feet)[a]

Ownership class and species group	Northeastern	Southern	Northwestern	Total
National Forest:				
Softwoods	643.7	90.5	—	734.2
Hardwoods	2,887.2	559.5	—	3,446.7
Total	3,530.9	650.0	—	4,180.9
Other public:				
Softwoods	21.7	3.7	22.4	47.8
Hardwoods	276.1	91.4	122.3	489.8
Total	297.8	95.1	144.7	537.6
Forest industry:				
Softwoods	113.3	56.3	105.2	274.8
Hardwoods	590.4	1,588.5	311.9	2,490.8
Total	703.7	1,644.8	417.1	2,765.6
Other private:				
Softwoods	567.4	386.8	588.7	1,542.9
Hardwoods	5,589.8	7,071.4	5,942.6	18,603.8
Total	6,157.2	7,458.2	6,531.3	20,146.7
All ownerships:				
Softwoods	1,346.1	537.3	716.3	2,599.7
Hardwoods	9,343.5	9,310.8	6,376.8	25,031.1
Total	10,689.6	9,848.1	7,093.1	27,630.8

[a] International 1/4-inch rule.

Table 42.—*Net volume of growing stock on commercial forest land in West Virginia, by stand-size classes, softwoods and hardwoods, and geographic units, 1975*

(In millions of cubic feet)

Stand-size class and species group	Northeastern	Southern	Northwestern	Total
Sawtimber stands:				
Softwoods	345.7	123.0	191.4	660.1
Hardwoods	3,127.6	2,787.1	1,957.7	7,872.4
Total	3,473.3	2,910.1	2,149.1	8,532.5
Poletimber stands:				
Softwoods	110.4	78.8	84.6	273.8
Hardwoods	1,683.5	1,308.1	939.9	3,931.5
Total	1,793.9	1,386.9	1,024.5	4,205.3
Other stands:				
Softwoods	22.7	7.3	31.1	61.1
Hardwoods	219.1	252.2	245.2	716.5
Total	241.8	259.5	276.3	777.6
All stands:				
Softwoods	478.8	209.1	307.1	995.0
Hardwoods	5,030.2	4,347.4	3,142.8	12,520.4
Total	5,509.0	4,556.5	3,449.9	13,515.4

Table 43.—*Net volume of sawtimber on commercial forest land in West Virginia, by stand-size classes, softwoods and hardwoods, and geographic units, 1975*

(In millions of board feet)[a]

Stand-size class and species group	Northeastern	Southern	Northwestern	Total
Sawtimber stands:				
Softwoods	1,116.0	380.5	527.3	2,023.8
Hardwoods	7,353.8	7,329.2	4,948.3	19,631.3
Total	8,469.8	7,709.7	5,475.6	21,655.1
Poletimber stands:				
Softwoods	175.8	136.4	122.9	435.1
Hardwoods	1,730.5	1,604.5	1,067.1	4,402.1
Total	1,906.3	1,740.9	1,190.0	4,837.2
Other stands:				
Softwoods	54.3	20.4	66.1	140.8
Hardwoods	259.2	377.1	361.4	997.7
Total	313.5	397.5	427.5	1,138.5
All stands:				
Softwoods	1,346.1	537.3	716.3	2,599.7
Hardwoods	9,343.5	9,310.8	6,376.8	25,031.1
Total	10,689.6	9,848.1	7,093.1	27,630.8

[a] International 1/4-inch rule.

Table 44.—*Net volume of growing stock on commercial forest land in West Virginia, by forest types and geographic units, 1975*

(In millions of cubic feet)

Forest type	Northeastern	Southern	Northwestern	Total
White and red pine	39.8	143.4	—	183.2
Spruce-fir	149.4	1.9	—	151.3
Virginia and pitch pine	127.1	31.9	271.2	430.2
Oak-pine	244.0	117.6	196.9	558.5
Oak-hickory	2,713.1	2,851.7	2,157.3	7,722.1
Elm-ash-cottonwood	372.6	143.9	248.1	764.6
Maple-beech-birch	1,863.0	1,266.1	576.4	3,705.5
All types	5,509.0	4,556.5	3,449.9	13,515.4

Table 45.—*Net volume of sawtimber on commercial forest land in West Virginia, by forest types and geographic units, 1975*

(In millions of board feet)[a]

Forest type	Northeastern	Southern	Northwestern	Total
White and red pine	67.9	253.5	—	321.4
Spruce-fir	455.7	5.9	—	461.6
Virginia and pitch pine	212.1	67.1	530.6	809.8
Oak-pine	472.8	304.2	397.2	1,174.2
Oak-hickory	4,880.2	6,169.4	4,329.9	15,379.5
Elm-ash-cottonwood	667.6	264.3	471.9	1,403.8
Maple-beech-birch	3,933.3	2,783.7	1,363.5	8,080.5
All types	10,689.6	9,848.1	7,093.1	27,630.8

[a] International 1/4-inch rule.

Table 46.—*Net volume of growing stock on commercial forest land, by species and diameter classes, Northeastern Unit, West Virginia, 1975*

(In millions of cubic feet)

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Virginia pine	103.5	17.6	28.6	21.5	20.2	8.5	4.9	2.2	—	—	—
Other yellow pines	76.8	3.3	18.5	18.6	14.7	14.3	4.0	1.6	1.8	—	—
White pine	71.0	6.8	15.4	8.1	6.5	4.9	2.4	4.5	7.9	7.6	6.9
Red spruce	138.8	4.1	12.9	18.0	28.3	22.0	27.2	13.5	7.7	5.1	—
Hemlock[a]	88.7	14.6	11.1	6.2	8.4	9.9	9.7	9.9	8.7	9.5	.7
Total softwoods	478.8	46.4	86.5	72.4	78.1	59.6	48.2	31.7	26.1	22.2	7.6
Select white oaks[b]	359.7	35.7	46.5	55.4	62.1	55.9	38.2	23.6	17.9	16.8	7.6
Select red oaks[c]	627.8	49.1	55.8	83.0	83.1	73.1	77.6	64.3	46.7	80.6	14.5
Other white oaks[d]	627.5	73.0	85.8	115.8	87.6	84.7	54.6	53.1	27.5	39.9	5.5
Other red oaks[e]	344.8	47.7	58.0	49.5	37.0	40.1	40.1	25.0	13.0	26.6	7.8
Red maple	476.0	78.7	98.3	92.3	92.1	51.3	21.0	16.4	4.5	20.4	1.0
Sugar maple	342.7	58.4	64.3	71.0	42.3	34.1	30.5	13.3	3.5	24.2	1.1
Yellow birch	105.1	25.3	26.9	18.0	5.6	2.0	6.2	2.0	6.3	12.8	—
Sweet birch	147.6	40.7	32.3	29.3	15.2	17.1	7.5	2.5	3.0	—	—
Hickory	351.9	46.3	72.7	79.0	64.2	36.8	21.4	13.5	6.1	10.6	1.3
Beech	259.8	23.6	28.2	34.0	40.8	32.8	36.5	29.2	11.7	23.0	—
Ash	100.1	11.1	15.6	11.5	16.6	14.5	14.0	10.0	3.8	3.0	—
Black walnut	21.0	2.3	5.0	2.3	.7	5.4	3.4	—	—	1.9	—
Yellow-poplar	483.3	39.4	52.2	62.4	69.0	84.7	81.3	40.1	21.7	30.5	2.0
Cucumbertree	30.2	4.7	4.0	3.7	6.4	4.0	4.5	1.3	.6	1.0	—
Blackgum	49.4	11.6	9.0	2.5	6.9	2.5	4.1	3.6	6.1	3.1	—
Black cherry	330.5	21.1	29.1	48.6	49.5	74.9	42.1	27.2	24.7	13.3	—
Basswood	132.6	5.1	12.7	28.0	23.5	16.2	15.2	6.8	8.3	16.8	—
Other hardwoods	240.2	21.7	30.7	42.3	37.9	38.2	26.4	17.3	5.4	16.3	4.0
Total hardwoods	5,030.2	595.5	727.1	828.6	740.5	668.3	524.6	349.2	210.8	340.8	44.8
All species	5,509.0	641.9	813.6	901.0	818.6	727.9	572.8	380.9	236.9	363.0	52.4

[a] Includes 1.0 million cubic feet of redcedar.

[b] Includes 358.4 million cubic feet of white oak; and 1.3 million of chinkapin oak.

[c] Includes only northern red oak.

[d] Includes 624.9 million cubic feet of chestnut oak and 2.6 million of post oak.

[e] Includes 196.9 million cubic feet of black oak; 147.1 million of scarlet oak; and 0.8 million of willow oak.

Table 47.—*Net volume of growing stock on commercial forest land, by species and diameter classes, Southern Unit, West Virginia, 1975*

(In millions of cubic feet)

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Virginia pine	30.9	5.3	7.7	7.2	5.3	2.7	1.8	0.9	—	—	—
Other yellow pines	15.4	1.2	2.4	2.7	3.5	—	3.8	.3	1.5	—	—
White pine	53.2	9.6	11.9	4.3	7.5	2.6	2.9	5.3	3.9	5.2	—
Red spruce	14.5	.3	.8	1.7	2.4	3.2	2.6	2.0	.9	.6	—
Hemlock	95.1	16.6	13.0	8.3	11.7	10.2	10.4	8.2	5.9	10.8	—
Total softwoods	209.1	33.0	35.8	24.2	30.4	18.7	21.5	16.7	12.2	16.6	—
Select white oaks[a]	433.4	46.8	56.7	58.4	65.1	55.8	52.9	40.8	24.6	27.1	5.2
Select red oaks[b]	441.1	21.3	40.1	53.8	47.9	60.3	59.9	44.9	37.5	66.3	9.1
Other white oaks[c]	452.7	63.6	58.0	53.2	46.9	54.0	43.3	38.5	33.5	52.4	9.3
Other red oaks[d]	605.0	52.7	62.8	72.2	60.1	97.6	65.9	55.6	47.5	77.9	12.7
Red maple	258.2	46.1	54.3	49.4	23.6	33.9	14.0	13.4	4.6	15.4	3.5
Sugar maple	210.4	41.5	41.0	33.0	19.1	19.2	9.6	9.4	10.5	21.9	5.2
Yellow birch	37.4	9.3	9.0	6.0	3.8	1.1	1.8	2.1	1.1	3.2	—
Sweet birch	94.2	27.2	21.3	21.1	8.9	4.8	.4	2.6	4.4	3.5	—
Hickory	459.3	58.3	73.2	80.5	76.0	56.9	48.7	34.7	15.2	15.8	—
Beech	230.5	26.5	22.1	27.6	33.5	29.6	34.3	14.0	10.9	23.0	9.0
Ash	75.7	7.7	3.8	8.2	16.9	17.5	9.3	4.1	.4	5.6	2.2
Black walnut	27.8	2.1	2.0	6.7	3.4	.9	4.0	4.3	1.2	3.2	—
Yellow-poplar	630.8	46.7	64.0	85.6	97.8	109.0	90.0	62.7	37.4	36.3	1.3
Cucumbertree	79.1	5.9	16.3	10.3	15.4	10.5	11.6	4.9	4.2	—	—
Blackgum	53.4	7.6	5.0	3.4	1.7	8.0	5.6	5.7	3.6	12.8	—
Black cherry	70.3	8.0	5.5	8.2	11.1	15.0	10.0	4.3	3.9	4.3	—
Basswood	23.2	5.0	2.5	4.5	3.1	1.9	2.7	.5	.7	2.3	—
Other hardwoods	164.9	23.8	39.6	29.7	21.3	21.2	13.8	5.8	.9	8.8	—
Total hardwoods	4,347.4	500.1	577.2	611.8	555.6	597.2	477.8	348.3	242.1	379.8	57.5
All species	4,556.5	533.1	613.0	636.0	586.0	615.9	499.3	365.0	254.3	396.4	57.5

[a] Includes only white oak.

[b] Includes only northern red oak.

[c] Includes only chestnut oak.

[d] Includes 404.2 million cubic feet of black oak; 190.2 million of scarlet oak; and 10.6 million of pin oak.

Table 48.—*Net volume of growing stock on commercial forest land, by species and diameter classes, Northwestern Unit, West Virginia, 1975*

(In millions of cubic feet)

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 +
Virginia pine	282.1	32.8	62.9	71.8	61.3	36.1	13.5	3.7	—	—	—
Other yellow pines	22.9	1.9	2.5	5.6	5.3	2.8	3.9	.9	—	—	—
White pine	1.3	—	—	—	—	—	—	—	.6	.7	—
Redcedar	.8	—	—	—	.8	—	—	—	—	—	—
Total softwoods	307.1	34.7	65.4	77.4	67.4	38.9	17.4	4.6	.6	.7	—
Select white oaks[a]	499.9	49.5	75.0	87.9	73.1	70.8	49.4	34.6	27.9	24.7	7.0
Select red oaks[b]	225.2	13.8	12.7	21.4	20.2	24.1	30.4	23.6	18.5	47.9	12.6
Other white oaks[c]	304.5	22.1	43.6	44.8	40.7	43.3	32.3	22.9	22.5	28.8	3.5
Other red oaks[d]	477.3	31.0	41.7	56.1	52.8	78.2	71.3	56.7	29.5	49.4	10.6
Red maple	95.7	31.3	15.9	20.0	7.1	8.4	6.7	3.0	2.5	.8	—
Sugar maple	205.5	33.9	28.3	45.4	25.6	24.4	16.2	10.3	5.4	14.9	1.1
Sweet birch	8.9	3.3	4.1	1.5	—	—	—	—	—	—	—
Hickory	362.6	105.9	79.9	62.9	35.6	37.5	19.8	10.5	6.2	4.3	—
Beech	122.0	7.1	11.1	16.1	15.0	12.2	23.4	13.5	10.0	12.6	1.0
Ash	106.4	15.0	20.0	9.4	17.8	11.5	14.3	6.6	4.4	7.4	—
Black walnut	58.4	7.0	7.3	11.4	11.8	10.3	4.2	2.1	2.2	2.1	—
Yellow-poplar	298.7	31.0	41.2	41.0	50.4	43.2	36.0	30.5	12.3	11.4	1.7
Cucumbertree	15.4	.6	2.9	2.3	4.6	.9	1.1	2.0	1.0	—	—
Blackgum	29.7	5.5	3.0	.8	4.6	4.9	1.9	4.2	1.0	3.8	—
Black cherry	52.8	4.5	7.0	6.6	7.4	11.4	5.4	3.7	3.1	3.7	—
Basswood	51.7	3.6	3.2	12.5	12.5	4.5	1.1	6.6	2.6	5.1	—
Other hardwoods	228.1	36.5	49.8	35.8	31.2	17.9	18.5	12.9	15.8	7.5	2.2
Total hardwoods	3,142.8	401.6	446.7	475.9	410.4	403.5	332.0	243.7	164.9	224.4	39.7
All species	3,449.9	436.3	512.1	553.3	477.8	442.4	349.4	248.3	165.5	225.1	39.7

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[a] Includes 498.1 million cubic feet of white oak; 1.0 million of swamp white oak; and 0.8 million of chinkapin oak.

[b] Includes only northern red oak.

[c] Includes 301.4 million cubic feet of chestnut oak and 3.1 million of post oak.

[d] Includes 316.3 million cubic feet of black oak; 160.2 million of scarlet oak; and 0.8 million of willow oak.

Table 49.—*Net volume of sawtimber on commercial forest land, by species and diameter classes, Northestern Unit, West Virginia, 1975*

(In millions of board feet)[a]

Species	All classes	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Virginia pine	199.2	64.5	71.1	33.2	21.3	9.1	—	—	—
Other yellow pines	189.7	56.6	50.4	55.3	16.1	4.8	6.5	—	—
White pine	199.1	26.5	23.9	19.4	10.6	20.3	39.4	41.7	17.3
Red spruce	518.3	59.4	111.6	95.2	120.0	65.7	40.4	26.0	—
Hemlock[b]	239.8	19.2	32.4	39.2	29.4	41.7	36.9	38.1	2.9
Total softwoods	1,346.1	226.2	289.4	242.3	197.4	141.6	123.2	105.8	20.2
Select white oaks[c]	722.4	—	190.1	175.1	129.3	79.4	62.9	61.4	24.2
Select red oaks[d]	1,402.7	—	234.4	233.7	255.5	214.6	156.0	268.4	40.1
Other white oaks[e]	1,121.5	—	251.1	268.2	175.6	176.9	95.6	134.9	19.2
Other red oaks[f]	619.2	—	110.3	131.3	135.0	83.0	44.5	87.7	27.4
Red maple	619.5	—	257.6	157.0	65.3	52.7	15.3	67.8	3.8
Sugar maple	485.3	—	128.7	109.9	101.3	45.0	12.0	84.9	3.5
Yellow birch	121.7	—	14.2	7.0	24.5	7.3	27.5	41.2	—
Sweet birch	144.9	—	46.1	53.9	24.2	7.9	12.8	—	—
Hickory	474.9	—	188.6	110.5	69.5	44.0	20.4	37.3	4.6
Beech	604.7	—	113.3	109.3	131.8	116.2	47.9	86.2	—
Ash	194.8	—	47.8	46.1	46.7	31.4	12.8	10.0	—
Black walnut	37.0	—	2.2	17.3	11.2	—	—	6.3	—
Yellow-poplar	1,085.4	—	201.6	264.7	287.5	140.7	76.7	106.8	7.4
Cucumbertree	57.1	—	19.3	12.4	15.0	4.5	2.1	3.8	—
Blackgum	84.7	—	20.8	8.1	12.6	12.1	20.6	10.5	—
Black cherry	821.3	—	148.4	263.7	157.7	100.8	100.5	50.2	—
Basswood	271.8	—	62.3	51.4	50.7	22.9	28.4	56.1	—
Other hardwoods	474.6	—	110.6	121.6	92.5	57.6	22.2	56.6	13.5
Total hardwoods	9,343.5	—	2,147.4	2,141.2	1,785.9	1,197.0	758.2	1,170.1	143.7
All species	10,689.6	226.2	2,436.8	2,383.5	1,983.3	1,338.6	881.4	1,275.9	163.9

[a] International 1/4-inch rule.

[b] Includes 4.0 million board feet of redcedar.

[c] Includes 719.7 million board feet of white oak and 2.7 million of chinkapin oak.

[d] Includes only northern red oak.

[e] Includes 1,117.6 million board feet of chestnut oak and 3.9 million of post oak.

[f] Includes 363.0 million board feet of black oak and 256.2 million of scarlet oak.

Table 50.—*Net volume of sawtimber on commercial forest land, by species and diameter classes, Southern Unit, West Virginia, 1975*

(In millions of board feet)[a]

Species	All classes	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Virginia pine	63.5	22.3	19.0	10.5	7.2	4.5	—	—	—
Other yellow pines	42.9	8.5	12.5	—	15.3	.7	5.9	—	—
White pine	124.1	13.3	26.5	9.9	12.7	23.2	17.7	20.8	—
Red spruce	46.9	4.5	8.2	11.3	8.9	7.8	4.0	2.2	—
Hemlock	259.9	25.7	42.5	39.3	41.6	34.6	26.9	49.3	—
Total softwoods	537.3	74.3	108.7	71.0	85.7	70.8	54.5	72.3	—
Select white oaks[b]	947.2	—	196.5	190.6	190.0	151.8	94.9	102.9	20.5
Select red oaks[c]	1,156.4	—	140.5	201.6	216.0	166.7	142.2	258.0	31.4
Other white oaks[d]	969.9	—	136.6	177.8	152.9	141.2	125.9	199.5	36.0
Other red oaks[e]	1,490.3	—	178.5	331.3	237.8	208.8	179.8	306.5	47.6
Red maple	367.2	—	65.0	111.5	51.0	49.5	17.8	58.7	13.7
Sugar maple	332.6	—	56.8	62.5	34.6	34.4	40.2	83.8	20.3
Yellow birch	43.1	—	10.9	3.5	6.5	7.7	3.7	10.8	—
Sweet birch	83.3	—	25.3	15.5	1.3	9.6	17.6	14.0	—
Hickory	856.0	—	227.9	194.5	178.4	132.7	58.8	63.7	—
Beech	542.6	—	97.6	96.5	122.8	53.1	43.3	93.3	36.0
Ash	186.5	—	49.1	56.9	33.1	14.2	1.2	22.3	9.7
Black walnut	60.1	—	10.0	3.0	14.8	15.9	4.3	12.1	—
Yellow-poplar	1,534.1	—	292.3	367.7	333.7	241.1	148.8	145.9	4.6
Cucumbertree	156.6	—	45.3	34.1	42.5	17.9	16.8	—	—
Blackgum	137.6	—	4.7	26.3	21.3	21.4	14.0	49.9	—
Black cherry	171.2	—	32.2	50.5	37.5	17.1	17.1	16.8	—
Basswood	34.1	—	7.7	5.8	9.3	1.6	2.4	7.3	—
Other hardwoods	242.0	—	63.1	69.9	49.9	21.0	4.0	34.1	—
Total hardwoods	9,310.8	—	1,640.0	1,999.5	1,733.4	1,305.7	932.8	1,479.6	219.8
All species	9,848.1	74.3	1,748.7	2,070.5	1,819.1	1,376.5	987.3	1,551.9	219.8

[a] International 1/4-inch rule.

[b] Includes only white oak.

[c] Includes only northern red oak.

[d] Includes only chestnut oak.

[e] Includes 1,036.6 million board feet of black oak; 422.8 million of scarlet oak; and 30.9 million of pin oak.

Table 51.—*Net volume of sawtimber on commercial forest land, by species and diameter classes, Northwestern Unit, West Virginia, 1975*

(In millions of board feet)[a]

Species	All classes	Diameter class (inches at breast height) 9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Virginia pine	640.5	217.4	212.2	139.9	55.3	15.7	—	—	—
Other yellow pines	67.6	17.4	18.8	11.0	15.8	4.6	—	—	—
White pine	5.6	—	—	—	—	—	2.7	2.9	—
Redcedar	2.6	—	2.6	—	—	—	—	—	—
Total softwoods	716.3	234.8	233.6	150.9	71.1	20.3	2.7	2.9	—
Select white oaks[b]	998.5	—	228.7	245.7	174.2	127.9	102.5	92.6	26.9
Select red oaks[c]	644.7	—	63.5	82.6	109.8	86.7	69.6	183.7	48.8
Other white oaks[d]	677.2	—	126.0	147.0	114.4	82.3	83.8	109.6	14.1
Other red oaks[e]	1,244.9	—	166.7	269.9	258.2	212.0	110.1	187.6	40.4
Red maple	99.2	—	21.5	28.9	24.2	11.6	9.5	3.5	—
Sugar maple	340.1	—	77.9	83.5	58.0	38.3	20.3	57.8	4.3
Hickory	389.7	—	111.2	130.7	69.8	38.5	23.0	16.5	—
Beech	312.0	—	45.2	41.5	82.8	50.0	38.8	49.4	4.3
Ash	209.7	—	53.8	38.4	49.8	23.6	16.0	28.1	—
Black walnut	109.7	—	35.7	35.1	14.7	7.7	8.2	8.3	—
Yellow-poplar	648.2	—	158.0	151.7	128.4	114.2	45.4	43.3	7.2
Cucumbertree	33.6	—	14.8	3.1	3.9	7.8	4.0	—	—
Blackgum	73.8	—	14.5	16.6	7.1	15.8	4.0	15.8	—
Black cherry	119.6	—	22.4	39.5	18.8	13.8	10.9	14.2	—
Basswood	111.6	—	38.7	16.1	4.3	23.9	9.6	19.0	—
Other hardwoods	364.3	—	95.0	60.2	65.1	47.5	59.8	28.5	8.2
Total hardwoods	6,376.8	—	1,273.6	1,390.5	1,183.5	901.6	615.5	857.9	154.2
All species	7,093.1	234.8	1,507.2	1,541.4	1,254.6	921.9	618.2	860.8	154.2

[a] International 1/4-inch rule.

[b] Includes 995.1 million board feet of white oak and 3.4 million of swamp white oak.

[c] Includes only northern red oak.

[d] Includes 673.5 million board feet of chestnut oak and 3.7 million of post oak.

[e] Includes 821.5 million board feet of black oak and 423.4 million of scarlet oak.

Table 52.—*Net volume of sawtimber on commercial forest land, by species and quality classes, Northeastern Unit, West Virginia, 1975*

(In millions of board feet)[a]

Species	All classes	Standard-lumber logs			
		Grade 1	Grade 2	Grade 3	Grade 4[b]
Softwoods:					
White pine	199.1	14.8	43.8	120.7	19.8
Virginia pine	199.2	4.0	5.4	189.8	—
Other yellow pines	189.7	10.8	13.8	165.1	—
Other softwoods[c]	758.1	—	—	—	—
Total softwoods	1,346.1	29.6	63.0	475.6	19.8
Hardwoods:					
Select white oaks	722.4	48.7	105.2	467.3	101.2
Select red oaks	1,402.7	283.7	296.2	670.1	152.7
Other white oaks	1,121.5	128.1	176.9	589.3	227.2
Other red oaks	619.2	94.1	94.6	354.6	75.9
Red maple	619.5	57.0	70.9	364.5	127.1
Sugar maple	485.3	40.8	62.3	299.7	82.5
Yellow birch	121.7	19.4	21.5	53.1	27.7
Sweet birch	144.9	10.6	27.3	86.0	21.0
Hickory	474.9	36.5	59.7	271.0	107.7
Beech	604.7	42.1	75.7	329.7	157.2
Ash	194.8	22.2	55.7	84.1	32.8
Black walnut	37.0	—	4.0	29.0	4.0
Yellow-poplar	1,085.4	225.4	174.8	516.1	169.1
Cucumbertree	57.1	2.9	7.8	35.8	10.6
Blackgum	84.7	13.3	17.3	44.9	9.2
Black cherry	821.3	136.8	163.5	361.5	159.5
Basswood	271.8	45.0	64.1	125.4	37.3
Other hardwoods	474.6	37.8	65.5	285.3	86.0
Total hardwoods	9,343.5	1,244.4	1,543.0	4,967.4	1,588.7
			Percent		
Hardwood quality	100	13	17	53	17

[a] International 1/4-inch rule.

[b] Grade 4 applies only to white pine. For hardwoods the volumes in this column are for construction logs.

[c] Species other than pine are not graded into standard-lumber grades.

Table 53.—*Net volume of sawtimber on commercial forest land, by species and quality classes, Southern Unit West Virginia, 1975*

(In millions of board feet)[a]

Species	All classes	Standard-lumber logs			
		Grade 1	Grade 2	Grade 3	Grade 4[b]
Softwoods:					
White pine	124.1	7.3	23.5	62.6	30.7
Virginia pine	63.5	7.3	4.1	52.1	—
Other yellow pines	42.9	3.1	4.8	35.0	—
Other softwoods[c]	306.8	—	—	—	—
Total softwoods	537.3	17.7	32.4	149.7	30.7
Hardwoods:					
Select white oaks	947.2	65.2	172.1	458.7	251.2
Select red oaks	1,156.4	335.5	245.3	424.8	150.8
Other white oaks	969.9	108.4	214.5	391.2	255.8
Other red oaks	1,490.3	266.7	278.1	590.7	354.8
Red maple	367.2	61.2	64.7	131.9	109.4
Sugar maple	332.6	67.4	74.9	107.1	83.2
Yellow birch	43.1	6.1	7.1	23.4	6.5
Sweet birch	83.3	16.0	17.4	28.5	21.4
Hickory	856.0	103.2	143.3	343.7	265.8
Beech	542.6	67.9	85.4	227.1	162.2
Ash	186.5	28.1	42.6	79.1	36.7
Black walnut	60.1	2.8	15.4	36.3	5.6
Yellow-poplar	1,534.1	382.5	330.9	542.3	278.4
Cucumbertree	156.6	17.7	33.5	67.2	38.2
Blackgum	137.6	29.2	42.1	49.2	17.1
Black cherry	171.2	30.6	35.9	61.4	43.3
Basswood	34.1	4.6	7.8	15.9	5.8
Other hardwoods	242.0	10.4	42.5	130.9	58.2
Total hardwoods	9,310.8	1,603.5	1,853.5	3,709.4	2,144.4
	- - - - - - - - -	- - - - - - - - -	*Percent*	- - - - - - - - -	- - - - - - - - -
Hardwood quality	100	17	20	40	23

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[a] International 1/4-inch rule.

[b] Grade 4 applies only to white pine. For hardwoods the volumes in this column are for construction logs.

[c] Species other than pine are not graded into standard-lumber grades.

Table 54.—*Net volume of sawtimber on commercial forest land, by species and quality classes, Northwestern Unit, West Virginia, 1975*

(In millions of board feet)[a]

Species	All classes	Standard-lumber logs			
		Grade 1	Grade 2	Grade 3	Grade 4[b]
Softwoods:					
White pine	5.6	—	1.4	1.7	2.5
Virginia pine	640.5	5.2	17.6	617.7	—
Other yellow pines	67.6	4.3	3.1	60.2	—
Other softwoods[c]	2.6	—	—	—	—
Total softwoods	716.3	9.5	22.1	679.6	2.5
Hardwoods:					
Select white oaks	998.5	68.1	153.8	444.6	332.0
Select red oaks	644.7	123.2	164.5	246.4	110.6
Other white oaks	677.2	60.8	127.2	309.3	179.9
Other red oaks	1,244.9	134.6	160.4	488.8	461.1
Red maple	99.2	5.4	10.1	49.4	34.3
Sugar maple	340.1	36.1	50.7	138.4	114.9
Hickory	389.7	21.3	34.3	184.5	149.6
Beech	312.0	10.7	32.1	134.5	134.7
Ash	209.7	28.9	39.4	98.2	43.2
Black walnut	109.7	2.4	8.1	66.1	33.1
Yellow-poplar	648.2	50.9	94.3	278.9	224.1
Cucumbertree	33.6	2.6	6.2	22.0	2.8
Blackgum	73.8	12.2	17.3	31.8	12.5
Black cherry	119.6	2.3	19.5	60.9	36.9
Basswood	111.6	7.5	23.8	62.0	18.3
Other hardwoods	364.3	17.6	41.8	203.4	101.5
Total hardwoods	6,376.8	584.6	983.5	2,819.2	1,989.5
	Percent				
Hardwood quality	100	9	16	44	31

[a] International 1/4-inch rule.

[b] Grade 4 applies only to white pine. For hardwoods the volumes in this column are for construction logs.

[c] Species other than pine are not graded into standard-lumber grades.

Table 55.—*Current annual net growth and removals of growing stock on commercial forest land in West Virginia, by species and geographic units, 1974*

(In thousands of cubic feet)

Species	Annual net growth			Annual timber removals		
	Northeastern	Southern	Northwestern	Northeastern	Southern	Northwestern
Softwoods:						
Virginia pine	21,800	1,700	7,900	3,000	—	—
White pine	5,700	600	4,100	—	—	—
Other softwoods	11,500	3,500	1,800	1,100	6,500	—
Total softwoods	39,000	5,800	13,800	4,100	6,500	—
Hardwoods:						
Select white oaks	5,800	7,300	33,200	7,800	8,100	1,500
Select red oaks	28,400	13,700	12,600	7,100	8,200	4,100
Other white oaks	14,400	8,900	3,800	5,700	4,400	—
Other red oaks	9,000	7,400	16,600	4,400	10,700	3,000
Maples	32,000	24,300	17,000	9,000	3,500	400
Hickory	2,700	5,200	10,500	5,100	6,000	700
Beech	2,300	7,500	2,800	5,100	12,800	1,900
Ash, black cherry & walnut	26,200	5,400	8,100	1,800	800	900
Yellow-poplar	24,000	41,500	12,600	10,600	10,800	6,200
Other hardwoods	16,500	7,800	7,400	4,800	5,500	4,600
Total hardwoods	161,300	129,000	124,600	61,400	70,800	23,300
Total, all species	200,300	134,800	138,400	65,500	77,300	23,300

Table 56.—*Current annual net growth and removals of sawtimber on commercial forest land in West Virginia, by species and geographic units, 1974*

(In thousands of board feet)[a]

Species	Annual net growth			Annual timber removals		
	Northeastern	Southern	Northwestern	Northeastern	Southern	Northwestern
Softwoods:						
Virginia pine	62,700	2,900	31,200	3,500	—	—
White pine	11,000	6,700	15,900	—	—	—
Other softwoods	32,300	6,200	3,100	2,000	22,300	—
Total softwoods	106,000	15,800	50,200	5,500	22,300	—
Hardwoods:						
Select white oaks	9,400	13,700	51,900	18,100	22,300	4,700
Select red oaks	53,200	32,400	22,700	15,100	23,100	13,100
Other white oaks	23,100	8,400	11,000	13,900	12,000	—
Other red oaks	10,200	17,200	33,800	8,300	30,400	9,600
Maples	34,900	29,100	15,800	22,300	9,500	1,200
Hickory	4,100	7,600	9,800	11,800	16,400	2,200
Beech	5,500	10,500	5,700	10,200	35,500	6,000
Ash, black cherry & walnut	48,100	5,400	8,600	4,000	2,100	2,700
Yellow-poplar	58,100	58,200	22,400	22,800	30,200	19,600
Other hardwoods	21,800	8,800	9,600	9,100	14,900	14,100
Total hardwoods	268,400	191,300	191,300	135,600	196,500	73,200
Total, all species	374,400	207,100	241,500	141,100	218,800	73,200

[a] International 1/4-inch rule.

Table 57.—*Land area in West Virginia, by land classes, counties, and geographic units, 1975.*

County	Total land area[a]	Nonforest land area	Forest land		
			Non-commercial[b]	Commercial	Sampling error of total[c]
	Thousand acres				*Percent*
Barbour	218.2	81.4	0.9	135.9	10
Berkeley	202.2	83.0	1.2	118.0	12
Braxton	330.9	77.9	1.0	252.0	6
Grant	305.9	67.6	2.1	236.2	6
Hampshire	409.0	87.7	1.7	319.6	5
Hardy	374.4	71.6	5.1	297.7	5
Harrison	267.5	120.2	2.5	144.8	13
Jefferson	134.9	96.3	2.1	36.5	35
Lewis	250.9	82.6	.7	167.6	9
Mineral	211.2	44.6	.7	165.9	6
Morgan	149.1	32.2	6.6	110.3	7
Pendleton	444.8	109.4	34.2	301.2	6
Pocahontas	603.5	84.9	15.3	503.3	7
Preston	412.8	110.7	1.4	300.7	6
Randolph	663.0	80.6	13.3	569.1	4
Taylor	111.4	45.1	1.4	64.9	15
Tucker	269.5	38.6	20.2	210.7	9
Upshur	225.3	70.5	.8	154.0	8
Webster	352.6	27.7	8.1	316.8	3
Northeastern Unit	5,937.1	1,412.6	119.3	4,405.2	1.4
Boone	320.6	56.6	—	264.0	10
Clay	219.5	29.8	—	189.7	6
Fayette	424.3	84.7	3.9	335.7	5
Greenbrier	656.7	154.8	1.0	500.9	4
Kanawha	580.4	122.3	—	458.1	4
Logan	291.9	56.0	3.3	232.6	10
McDowell	341.1	64.1	—	277.0	11
Mercer	266.8	77.1	.5	189.2	6
Mingo	270.7	47.9	—	222.8	10
Monroe	302.5	116.5	—	186.0	8
Nicholas	416.0	78.4	.3	337.3	6
Raleigh	387.3	88.5	1.4	297.4	5
Summers	223.8	60.4	4.4	159.0	6
Wyoming	322.6	52.3	6.8	263.5	5
Southern Unit	5,024.2	1,089.4	21.6	3,913.2	1.8
Brooke	56.4	29.8	—	26.6	27
Cabell	178.7	47.0	0.3	131.4	8
Calhoun	179.8	41.3	—	138.5	9
Doddridge	204.2	53.9	—	150.3	9
Gilmer	217.0	54.0	2.1	160.9	9
Hancock	53.2	26.4	1.5	25.3	27
Jackson	294.7	103.3	.2	191.2	8
Lincoln	280.3	33.4	—	246.9	4
Marion	199.0	65.6	1.2	132.2	10
Marshall	194.7	78.2	—	116.5	12
Mason	276.8	113.4	.4	163.0	10
Monongalia	233.5	83.8	.2	149.5	11
Ohio	68.0	30.6	—	37.4	21

Continued

Table 57.—Continued

County	Total land area[a]	Nonforest land area	Forest land		
			Non-commercial	Commercial	Sampling error of total[c]
	- - - - - - - - -	- - - - - - -Thousand acres-	- - - - - -	- -	-Percent
Pleasants	82.7	14.2	.1	68.4	8
Putnam	222.7	66.4	—	156.3	7
Ritchie	289.3	72.1	1.8	215.4	6
Roane	311.0	99.6	—	211.4	9
Tyler	163.6	44.3	—	119.3	9
Wayne	328.6	63.4	.1	265.1	5
Wetzel	232.1	50.1	.1	181.9	6
Wirt	150.4	27.3	—	123.1	6
Wood	235.8	81.1	—	154.7	9
Northwestern Unit	4,452.5	1,279.2	8.0	3,165.3	1.9
Total, State	15,413.8	3,781.2	148.9	11,483.7	1.0

[a] Source: Area Measurement Report, Bureau of the Census, Areas of West Virginia: 1960 (April 1967).
[b] Includes nonproductive and productive-reserved forest land.
[c] In percent at the 68 percent probability level for commercial forest land.

Table 58. *Area of commercial forest land in West Virginia, by stand-size class, county, and geographic unit, 1975*

(In thousands of acres)

County	Sawtimber stands	Poletimber stands	Sapling-and-seedling stands[a]	Total
Barbour	49.9	51.0	35.0	135.9
Berkeley	34.7	45.4	37.9	118.0
Braxton	105.4	90.6	56.0	252.0
Grant	82.3	92.6	61.3	236.2
Hampshire	107.5	134.4	77.7	319.6
Hardy	103.7	127.3	66.7	297.7
Harrison	36.8	51.0	57.0	144.8
Jefferson	7.4	10.4	18.7	36.5
Lewis	57.4	63.9	46.3	167.6
Mineral	53.3	68.0	44.6	165.9
Morgan	33.6	47.0	29.7	110.3
Pendleton	108.5	119.7	73.0	301.2
Pocahontas	254.6	190.1	58.6	503.3
Preston	117.5	113.0	70.2	300.7
Randolph	301.0	200.0	68.1	569.1
Taylor	18.4	23.4	23.1	64.9
Tucker	95.1	76.7	38.9	210.7
Upshur	62.5	56.1	35.4	154.0
Webster	156.3	121.6	38.9	316.8
Northeastern Unit	1,785.9	1,682.2	937.1	4,405.2

Continued

Table 58.—Continued

County	Sawtimber stands	Poletimber stands	Sapling-and-seedling stands [a]	Total
Boone	163.4	57.8	42.8	264.0
Clay	86.8	71.5	31.4	189.7
Fayette	153.2	124.5	58.0	335.7
Greenbrier	258.8	172.6	69.5	500.9
Kanawha	209.0	165.9	83.2	458.1
Logan	147.0	46.4	39.2	232.6
McDowell	146.5	65.3	65.2	277.0
Mercer	92.5	65.4	31.3	189.2
Mingo	130.1	48.5	44.2	222.8
Monroe	66.6	73.1	46.3	186.0
Nicholas	142.6	130.2	64.5	337.3
Raleigh	136.5	106.5	54.4	297.4
Summers	76.5	55.0	27.5	159.0
Wyoming	114.4	97.7	51.4	263.5
Southern Unit	1,923.9	1,280.4	708.9	3,913.2
Brooke	8.7	7.8	10.1	26.6
Cabell	49.5	42.9	39.0	131.4
Calhoun	49.0	45.1	44.4	138.5
Doddridge	72.6	43.3	34.4	150.3
Gilmer	72.9	48.2	39.8	160.9
Hancock	9.8	7.9	7.6	25.3
Jackson	78.7	61.1	51.4	191.2
Lincoln	110.6	82.8	53.5	246.9
Marion	60.1	37.2	34.9	132.2
Marshall	41.3	37.4	37.8	116.5
Mason	64.6	50.9	47.5	163.0
Monongalia	71.1	42.9	35.5	149.5
Ohio	14.7	11.8	10.9	37.4
Pleasants	40.7	19.2	8.5	68.4
Putnam	73.1	50.0	33.2	156.3
Ritchie	104.6	66.4	44.4	215.4
Roane	76.7	70.3	64.4	211.4
Tyler	51.7	36.7	30.9	119.3
Wayne	100.2	88.9	76.0	265.1
Wetzel	81.5	58.4	42.0	181.9
Wirt	64.8	39.5	18.8	123.1
Wood	69.0	48.3	37.4	154.7
Northwestern Unit	1,365.9	997.0	802.4	3,165.3
Total, State	5,075.7	3,959.6	2,448.4	11,483.7

[a] Includes 86,100 acres in nonstocked areas in the Northeastern Unit; 34,600 acres in the Southern Unit; and 10,700 acres in the Northwestern Unit.

Table 59.—*Area of commercial forest land in West Virginia, by forest type, county, and geographic unit, 1975*

(In thousands of acres)

County	Virginia and pitch pine	Other softwood types	Oak-hickory	Maple-beech-birch	Other hardwood types	All types
Barbour	0.7	1.9	74.5	37.4	21.4	135.9
Berkeley	13.5	1.5	72.9	8.0	22.1	118.0
Braxton	1.2	3.9	136.9	73.2	36.8	252.0
Grant	26.1	2.4	142.3	20.9	44.5	236.2
Hampshire	31.9	3.9	199.3	19.4	65.1	319.6
Hardy	32.4	3.2	183.5	18.8	59.8	297.7
Harrison	.6	2.7	73.6	36.3	31.6	144.8
Jefferson	3.4	.3	23.3	3.0	6.5	36.5
Lewis	1.2	2.7	93.6	44.8	25.3	167.6
Mineral	24.7	1.7	96.2	10.1	33.2	165.9
Morgan	16.4	1.0	62.8	6.5	23.6	110.3
Pendleton	27.5	5.3	178.5	26.4	63.5	301.2
Pocahontas	1.6	33.5	177.8	242.2	48.2	503.3
Preston	1.8	4.2	167.3	84.9	42.5	300.7
Randolph	1.6	9.1	270.6	236.2	51.6	569.1
Taylor	.3	1.1	34.1	16.8	12.6	64.9
Tucker	.5	5.8	102.7	77.4	24.3	210.7
Upshur	.8	2.1	84.5	44.0	22.6	154.0
Webster	1.3	3.5	162.6	119.0	30.4	316.8
Northeastern Unit	187.5	89.8	2,337.0	1,125.3	665.6	4,405.2
Boone	—	2.8	160.4	92.3	8.5	264.0
Clay	2.6	3.2	127.3	43.8	12.8	189.7
Fayette	4.9	4.4	225.2	78.1	23.1	335.7
Greenbrier	5.5	12.4	281.4	166.2	35.4	500.9
Kanawha	7.4	8.5	305.3	105.4	31.5	458.1
Logan	—	3.6	150.4	68.1	10.5	232.6
McDowell	—	4.6	174.0	81.8	16.6	277.0
Mercer	2.2	2.6	126.3	45.6	12.5	189.2
Mingo	—	3.3	139.8	68.7	11.0	222.8
Monroe	7.0	3.9	122.3	37.5	15.3	186.0
Nicholas	6.1	3.9	217.8	85.8	23.7	337.3
Raleigh	4.5	3.1	199.7	69.5	20.6	297.4
Summers	2.3	2.8	104.7	38.3	10.9	159.0
Wyoming	5.7	11.3	171.4	57.7	17.4	263.5
Southern Unit	48.2	70.4	2,506.0	1,038.8	249.8	3,913.2
Brooke	1.2	—	17.7	3.8	3.9	26.6
Cabell	13.1	—	79.7	17.8	20.8	131.4
Calhoun	17.1	—	79.7	18.4	23.3	138.5
Doddridge	4.2	—	103.1	21.7	21.3	150.3
Gilmer	5.1	—	109.7	22.2	23.9	160.9
Hancock	.9	—	16.5	4.3	3.6	25.3
Jackson	19.4	—	116.3	27.1	28.4	191.2
Lincoln	7.8	—	161.0	39.5	38.6	246.9
Marion	4.5	—	91.3	18.2	18.2	132.2
Marshall	4.8	—	75.3	18.6	17.8	116.5
Mason	27.4	—	90.6	20.9	24.1	163.0
Monongalia	4.2	—	102.5	21.6	21.2	149.5
Ohio	1.5	—	24.6	5.9	5.4	37.4
Pleasants	3.3	—	45.7	10.0	9.4	68.4

Continued

Table 59.—Continued

County	Virginia and pitch pine	Other softwood types	Oak-hickory	Maple-beech-birch	Other hardwood types	All types
Putnam	23.3	—	89.2	21.6	22.2	156.3
Ritchie	12.2	—	139.9	31.0	32.3	215.4
Roane	19.4	—	128.8	31.4	31.8	211.4
Tyler	7.4	—	76.6	17.2	18.1	119.3
Wayne	21.1	—	163.1	38.1	42.8	265.1
Wetzel	5.4	—	120.3	27.7	28.5	181.9
Wirt	20.9	—	67.1	16.9	18.2	123.1
Wood	25.3	—	86.4	20.6	22.4	154.7
Northwestern Unit	249.5	—	1,985.1	454.5	476.2	3,165.3
Total, State	485.2	160.2	6,828.1	2,618.6	1,391.6	11,483.7

Table 60.—*Net volume of growing stock on commercial forest land in West Virginia, by stand-size class, county, and geographic unit, 1975*

County	Sawtimber stands	Poletimber stands	Other stands	Total	Sampling error of total
	- - - - - - -	*Million cubic feet*	- - - - - - -		*Percent*
Barbour	79.2	57.3	10.4	146.9	17
Berkeley	46.1	45.4	7.5	99.0	15
Braxton	175.6	103.5	16.8	295.9	11
Grant	127.3	95.1	12.6	235.0	11
Hampshire	140.4	140.2	18.1	298.7	10
Hardy	140.1	135.3	15.6	291.0	10
Harrison	53.2	51.8	14.9	119.9	23
Jefferson	9.3	9.9	2.8	22.0	31
Lewis	86.8	70.0	14.9	171.7	14
Mineral	73.7	71.2	10.3	155.2	15
Morgan	48.3	47.3	6.7	102.3	18
Pendleton	148.8	125.1	15.3	289.2	11
Pocahontas	653.5	188.0	16.3	857.8	14
Preston	191.4	128.2	22.0	341.6	12
Randolph	751.6	219.5	18.5	989.6	9
Taylor	26.9	24.6	6.3	57.8	23
Tucker	253.1	80.0	8.5	341.6	17
Upshur	103.0	64.6	10.2	177.8	15
Webster	365.0	136.9	14.1	516.0	9
Northeastern Unit	3,473.3	1,793.9	241.8	5,509.0	2.8

Continued

Table 60.—Continued

County	Sawtimber stands	Poletimber stands	Other stands	Total	Sampling error of total
Boone	195.4	61.9	13.0	270.3	18
Clay	134.2	78.3	12.6	225.1	13
Fayette	234.9	135.1	23.0	393.0	11
Greenbrier	516.3	187.2	24.9	728.4	8
Kanawha	325.9	180.6	32.0	538.5	8
Logan	173.2	51.3	11.8	236.3	17
McDowell	168.4	70.4	20.7	259.5	21
Mercer	147.3	71.1	11.9	230.3	11
Mingo	153.4	52.7	13.8	219.9	17
Monroe	96.3	76.5	18.9	191.7	14
Nicholas	253.9	137.0	25.5	416.4	12
Raleigh	211.0	114.1	21.0	346.1	11
Summers	120.6	59.8	10.7	191.1	13
Wyoming	179.3	110.9	19.7	309.9	12
Southern Unit	2,910.1	1,386.9	259.5	4,556.5	3.2
Brooke	13.3	7.6	2.9	23.8	29
Cabell	75.3	42.5	13.7	131.5	15
Calhoun	73.6	43.6	15.6	132.8	14
Doddridge	120.8	44.5	10.8	176.1	13
Gilmer	119.1	49.0	12.8	180.9	13
Hancock	14.8	8.3	2.3	25.4	29
Jackson	121.4	62.5	17.6	201.5	12
Lincoln	170.0	86.7	20.1	276.8	11
Marion	100.5	36.8	10.7	148.0	14
Marshall	61.1	37.2	12.3	110.6	16
Mason	100.7	51.6	16.5	168.8	13
Monongalia	117.9	44.8	10.6	173.3	14
Ohio	22.2	12.1	3.6	37.9	24
Pleasants	69.2	22.0	2.8	94.0	17
Putnam	115.2	53.1	12.7	181.0	12
Ritchie	168.9	71.4	15.1	255.4	10
Roane	112.6	68.9	23.1	204.6	12
Tyler	82.5	37.6	10.5	130.6	16
Wayne	149.7	88.0	27.8	265.5	10
Wetzel	128.1	61.3	14.3	203.7	12
Wirt	103.0	44.0	7.3	154.3	12
Wood	109.2	51.0	13.2	173.4	12
Northwestern Unit	2,149.1	1,024.5	276.3	3,449.9	2.9
Total, State	8,532.5	4,205.3	777.6	13,515.4	1.6

Table 61.—*Net volume of sawtimber on commercial forest land in West Virginia, by stand-size class, county, and geographic unit, 1975*

County	Sawtimber stands	Poletimber stands	Other stands	Total	Sampling error of total
	Million board feet[a]				*Percent*
Barbour	188.6	63.8	12.8	265.2	25
Berkeley	108.8	47.8	10.7	167.3	21
Braxton	423.8	116.1	20.7	560.6	16
Grant	287.3	96.9	17.5	401.7	18
Hampshire	328.4	151.4	28.1	507.9	15
Hardy	330.4	143.2	22.5	496.1	16
Harrison	128.4	55.1	17.9	201.4	36
Jefferson	21.9	10.4	3.4	35.7	42
Lewis	205.1	75.4	18.5	299.0	21
Mineral	174.4	73.5	12.4	260.3	25
Morgan	114.2	46.5	8.7	169.4	32
Pendleton	325.9	132.3	22.5	480.7	16
Pocahontas	1,554.7	181.8	20.3	1,756.8	21
Preston	456.3	142.8	26.9	626.0	18
Randolph	1,840.0	235.7	22.9	2,098.6	13
Taylor	64.2	26.3	7.6	98.1	35
Tucker	666.9	84.4	9.7	761.0	25
Upshur	246.7	73.4	12.3	332.4	22
Webster	1,003.8	149.5	18.1	1,171.4	14
Northeastern Unit	8,469.8	1,906.3	313.5	10,689.6	4.2
Boone	544.8	82.7	30.3	657.8	21
Clay	353.6	99.8	16.4	469.8	20
Fayette	620.5	172.1	30.3	822.9	16
Greenbrier	1,293.8	220.2	33.6	1,547.6	11
Kanawha	862.7	226.2	42.3	1,131.2	12
Logan	479.0	70.2	25.1	574.3	20
McDowell	465.0	93.2	45.2	603.4	26
Mercer	394.5	89.6	15.6	499.7	16
Mingo	425.1	71.0	30.4	526.5	20
Monroe	247.9	91.6	27.4	366.9	21
Nicholas	675.3	167.7	32.7	875.7	17
Raleigh	561.2	143.9	27.0	732.1	15
Summers	321.5	74.8	14.4	410.7	19
Wyoming	464.8	137.9	26.8	629.5	17
Southern Unit	7,709.7	1,740.9	397.5	9,848.1	4.3
Brooke	33.7	8.9	4.7	47.3	40
Cabell	189.3	48.4	20.8	258.5	23
Calhoun	184.3	49.1	23.1	256.5	20
Doddridge	320.0	52.3	16.6	388.9	19
Gilmer	311.4	58.1	19.4	388.9	19
Hancock	36.9	9.7	4.1	50.7	41
Jackson	303.8	71.9	27.5	403.2	17
Lincoln	431.5	101.7	29.7	562.9	17
Marion	268.7	42.5	16.7	327.9	21
Marshall	153.2	42.7	18.8	214.7	24
Mason	251.8	58.4	27.3	337.5	19
Monongalia	309.5	53.4	17.5	380.4	19
Ohio	55.8	14.3	5.9	76.0	34
Pleasants	181.4	26.9	4.6	212.9	26

Continued

Table 61.—Continued

County	Sawtimber stands	Poletimber stands	Other stands	Total	Sampling error of total
Putnam	289.2	60.8	20.4	370.4	18
Ritchie	432.3	85.9	23.8	542.0	15
Roane	280.5	77.1	34.9	392.5	18
Tyler	212.4	44.2	15.9	272.5	23
Wayne	375.3	100.3	40.6	516.2	16
Wetzel	325.9	73.1	21.5	420.5	19
Wirt	255.0	51.6	11.9	318.5	18
Wood	273.7	58.7	21.8	354.2	18
Northwestern Unit	5,475.6	1,190.0	427.5	7,093.1	4.3
Total, State	21,655.1	4,837.2	1,138.5	27,630.8	2.4

[a] International 1/4-inch rule.

Table 62.—*Net volume of growing stock on commercial forest land in West Virginia, by forest type, county, and geographic unit, 1975*

(In millions of cubic feet)

County	Virginia and pitch pine	Other softwood types	Oak-hickory	Maple-beech-birch	Other hard-wood types	All types
Barbour	0.6	3.2	77.8	46.0	19.3	146.9
Berkeley	7.8	1.2	62.4	9.9	17.7	99.0
Braxton	1.1	8.3	155.4	94.7	36.4	295.9
Grant	18.6	2.1	144.8	30.5	39.0	235.0
Hampshire	19.8	3.0	192.6	26.7	56.6	298.7
Hardy	22.3	2.8	183.5	28.6	53.8	291.0
Harrison	.5	3.4	63.0	34.1	18.9	119.9
Jefferson	2.0	.2	13.5	2.1	4.2	22.0
Lewis	1.0	4.1	93.9	51.5	21.2	171.7
Mineral	15.4	1.2	93.6	15.8	29.2	155.2
Morgan	12.2	.6	58.5	10.7	20.3	102.3
Pendleton	18.5	5.7	177.6	33.7	53.7	289.2
Pocahontas	1.7	88.2	265.3	451.6	51.0	857.8
Preston	1.6	7.7	183.7	107.8	40.8	341.6
Randolph	1.4	26.9	421.3	474.8	65.2	989.6
Taylor	.3	1.4	31.1	16.8	8.2	57.8
Tucker	.4	16.7	164.4	140.5	19.6	341.6
Upshur	.7	4.2	93.5	57.0	22.4	177.8
Webster	1.2	8.3	237.2	230.2	39.1	516.0
Northeastern Unit	127.1	189.2	2,713.1	1,863.0	616.6	5,509.0

Continued

Table 62.—Continued

County	Virginia and pitch pine	Other softwood types	Oak-hickory	Maple-beech-birch	Other hard-wood types	All types
Boone	—	7.0	171.7	85.0	6.6	270.3
Clay	1.6	5.7	150.1	53.7	14.0	225.1
Fayette	3.1	6.2	264.3	94.3	25.1	393.0
Greenbrier	3.9	29.2	371.1	277.5	46.7	728.4
Kanawha	4.9	16.1	355.6	127.3	34.6	538.5
Logan	—	8.9	157.3	62.1	8.0	236.3
McDowell	—	11.3	161.6	74.3	12.3	259.5
Mercer	1.4	4.6	153.2	56.2	14.9	230.3
Mingo	—	8.0	141.4	62.3	8.2	219.9
Monroe	5.0	7.2	124.7	41.1	13.7	191.7
Nicholas	3.7	4.7	250.0	134.6	23.4	416.4
Raleigh	2.8	3.7	233.4	83.3	22.9	346.1
Summers	1.5	5.4	125.7	45.7	12.8	191.1
Wyoming	4.0	27.3	191.6	68.7	18.3	309.9
Southern Unit	31.9	145.3	2,851.7	1,266.1	261.5	4,556.5
Brooke	0.8	—	15.7	4.2	3.1	23.8
Cabell	13.5	—	78.6	21.2	18.2	131.5
Calhoun	17.7	—	74.0	21.6	19.5	132.8
Doddridge	2.8	—	123.7	29.5	20.1	176.1
Gilmer	3.2	—	126.5	28.9	22.3	180.9
Hancock	.8	—	15.9	5.5	3.2	25.4
Jackson	22.9	—	118.9	33.0	26.7	201.5
Lincoln	5.8	—	182.1	53.3	35.6	276.8
Marion	2.8	—	104.6	24.3	16.3	148.0
Marshall	3.4	—	70.4	22.1	14.7	110.6
Mason	32.5	—	89.1	24.5	22.7	168.8
Monongalia	3.0	—	120.8	29.1	20.4	173.3
Ohio	1.1	—	24.6	7.3	4.9	37.9
Pleasants	4.5	—	64.1	14.4	11.0	94.0
Putnam	29.6	—	101.1	27.1	23.2	181.0
Ritchie	13.5	—	167.9	41.0	33.0	255.4
Roane	20.2	—	120.2	37.1	27.1	204.6
Tyler	7.2	—	85.2	21.5	16.7	130.6
Wayne	19.8	—	162.8	45.9	37.0	265.5
Wetzel	3.9	—	136.7	36.2	26.9	203.7
Wirt	29.7	—	81.4	22.8	20.4	154.3
Wood	32.5	—	93.0	25.9	22.0	173.4
Northwestern Unit	271.2	—	2,157.3	576.4	445.0	3,449.9
Total, State	430.2	334.5	7,722.1	3,705.5	1,323.1	13,515.4

Table 63.—*Net volume of sawtimber on commercial forest land in West Virginia, by forest type, county, and geographic unit, 1975*

(In millions of board feet) [a]

County	Virginia and pitch pine	Other softwood types	Oak-hickory	Maple-beech-birch	Other hardwood types	All types
Barbour	0.7	8.2	134.5	87.5	34.3	265.2
Berkeley	11.3	2.3	104.4	17.6	31.7	167.3
Braxton	1.4	21.8	284.3	186.9	66.2	560.6
Grant	35.4	3.6	232.7	56.1	73.9	401.7
Hampshire	29.4	5.8	329.0	41.0	102.7	507.9
Hardy	38.0	5.0	306.0	48.1	99.0	496.1
Harrison	.6	9.9	97.4	62.3	31.2	201.4
Jefferson	3.3	.5	21.1	3.8	7.0	35.7
Lewis	1.2	9.7	155.6	96.7	35.8	299.0
Mineral	26.3	2.4	149.7	28.1	53.8	260.3
Morgan	23.1	1.3	86.3	20.4	38.3	169.4
Pendleton	32.2	9.5	290.2	52.1	96.7	480.7
Pocahontas	2.6	256.8	438.0	949.9	109.5	1,756.8
Preston	1.9	18.6	324.3	209.1	72.1	626.0
Randolph	1.6	77.2	859.5	1,035.1	125.2	2,098.6
Taylor	.4	4.0	49.2	31.0	13.5	98.1
Tucker	.5	54.7	343.2	326.6	36.0	761.0
Upshur	.8	10.9	169.0	111.1	40.6	332.4
Webster	1.4	21.4	505.8	569.9	72.9	1,171.4
Northeastern Unit	212.1	523.6	4,880.2	3,933.3	1,140.4	10,689.6
Boone	—	9.2	424.8	206.0	17.8	657.8
Clay	3.4	11.9	311.7	113.6	29.2	469.8
Fayette	6.3	14.2	550.5	199.9	52.0	822.9
Greenbrier	8.1	53.8	792.1	583.7	109.9	1,547.6
Kanawha	10.3	31.6	746.5	271.2	71.6	1,131.2
Logan	—	11.4	390.2	150.8	21.9	574.3
McDowell	—	14.6	378.9	175.5	34.4	603.4
Mercer	2.8	9.4	332.2	122.5	32.8	499.7
Mingo	—	10.1	343.3	150.2	22.9	526.5
Monroe	11.1	13.5	237.7	83.0	21.6	366.9
Nicholas	7.3	11.7	506.4	306.8	43.5	875.7
Raleigh	5.4	9.2	492.3	177.9	47.3	732.1
Summers	3.3	10.4	271.4	98.7	26.9	410.7
Wyoming	9.1	48.4	391.4	143.9	36.7	629.5
Southern Unit	67.1	259.4	6,169.4	2,783.7	568.5	9,848.1
Brooke	1.8	—	30.0	9.4	6.1	47.3
Cabell	25.4	—	150.0	48.8	34.3	258.5
Calhoun	32.3	—	138.8	49.4	36.0	256.5
Doddridge	5.6	—	268.7	75.6	39.0	388.9
Gilmer	6.3	—	266.8	72.2	43.6	388.9
Hancock	1.9	—	30.2	12.2	6.4	50.7
Jackson	45.8	—	230.0	75.5	51.9	403.2
Lincoln	11.4	—	356.0	124.4	71.1	562.9
Marion	5.7	—	228.0	63.2	31.0	327.9
Marshall	7.2	—	129.4	50.0	28.1	214.7
Mason	62.6	—	175.6	55.7	43.6	337.5
Monongalia	6.5	—	260.9	73.0	40.0	380.4
Ohio	2.5	—	47.0	16.7	9.8	76.0
Pleasants	9.0	—	144.5	37.3	22.1	212.9

Continued

Table 63.—Continued

County	Virginia and pitch pine	Other softwood types	Oak-hickory	Maple-beech-birch	Other hardwood types	All types
Putnam	58.0	—	203.4	62.8	46.2	370.4
Ritchie	27.0	—	350.2	98.7	66.1	542.0
Roane	39.7	—	216.8	83.7	52.3	392.5
Tyler	13.7	—	174.1	52.1	32.6	272.5
Wayne	36.1	—	304.8	104.7	70.6	516.2
Wetzel	7.7	—	274.3	85.3	53.2	420.5
Wirt	60.0	—	164.4	52.7	41.4	318.5
Wood	64.4	—	186.0	60.1	43.7	354.2
Northwestern Unit	530.6	—	4,329.9	1,363.5	869.1	7,093.1
Total, State	809.8	783.0	15,379.5	8,080.5	2,578.0	27,630.8

[a] International 1/4-inch rule.

Table 64.—*Net volume of growing stock on commercial forest land in West Virginia, by species, county, and geographic unit, 1975*

(In millions of cubic feet)

County	Softwoods	Select oaks	Other hard hardwoods	Yellow-poplar	Other soft hardwoods	Total all species
Barbour	5.8	22.8	65.3	21.8	31.2	146.9
Berkeley	13.2	23.8	49.4	2.1	10.5	99.0
Braxton	13.3	47.4	131.7	42.0	61.5	295.9
Grant	33.9	54.3	112.7	3.5	30.6	235.0
Hampshire	38.0	73.7	149.2	6.1	31.7	298.7
Hardy	38.4	70.5	144.7	5.6	31.8	291.0
Harrison	5.7	16.8	50.7	20.0	26.7	119.9
Jefferson	3.0	5.3	10.8	0.5	2.4	22.0
Lewis	7.6	25.1	74.9	27.9	36.2	171.7
Mineral	22.8	36.7	76.0	2.6	17.1	155.2
Morgan	16.8	23.5	49.3	1.2	11.5	102.3
Pendleton	39.1	68.4	140.0	5.6	36.1	289.2
Pocahontas	89.0	133.2	387.5	43.9	204.2	857.8
Preston	14.7	52.9	150.8	51.7	71.5	341.6
Randolph	85.1	160.5	416.3	102.2	225.5	989.6
Taylor	2.7	8.2	24.8	9.6	12.5	57.8
Tucker	27.2	53.4	138.9	37.9	84.2	341.6
Upshur	7.3	28.5	79.7	25.1	37.2	177.8
Webster	15.2	82.5	218.0	74.0	126.3	516.0
Northeastern Unit	478.8	987.5	2,470.7	483.3	1,088.7	5,509.0

Continued

Table 64.—Continued

County	Softwoods	Select oaks	Other hard hardwoods	Yellow-poplar	Other soft hardwoods	Total all species
Boone	4.7	47.2	155.4	40.3	22.7	270.3
Clay	9.6	45.0	113.7	31.9	24.9	225.1
Fayette	13.9	79.5	200.4	55.9	43.3	393.0
Greenbrier	59.4	134.5	347.4	72.9	114.2	728.4
Kanawha	25.1	108.3	269.8	75.9	59.4	538.5
Logan	4.8	39.3	133.3	37.2	21.7	236.3
McDowell	6.2	48.6	140.9	41.7	22.1	259.5
Mercer	8.9	47.1	116.8	32.3	25.2	230.3
Mingo	4.5	38.1	124.5	33.9	18.9	219.9
Monroe	10.6	38.1	93.4	28.0	21.6	191.7
Nicholas	13.6	80.9	201.2	62.7	58.0	416.4
Raleigh	10.9	70.9	176.7	49.2	38.4	346.1
Summers	8.5	38.8	96.2	26.6	21.0	191.1
Wyoming	28.4	58.2	147.1	42.3	33.9	309.9
Southern Unit	209.1	874.5	2,316.8	630.8	525.3	4,556.5
Brooke	1.3	5.1	12.2	2.2	3.0	23.8
Cabell	14.4	26.3	62.9	12.1	15.8	131.5
Calhoun	17.9	25.1	62.1	12.3	15.4	132.8
Doddridge	6.4	40.1	94.8	14.8	20.0	176.1
Gilmer	7.2	41.0	95.6	15.7	21.4	180.9
Hancock	1.3	5.5	13.0	2.3	3.3	25.4
Jackson	23.6	40.6	96.1	17.3	23.9	201.5
Lincoln	12.7	61.5	142.2	24.9	35.5	276.8
Marion	5.5	33.5	80.2	12.6	16.2	148.0
Marshall	5.9	23.5	56.2	10.3	14.7	110.6
Mason	29.9	30.9	75.3	14.5	18.2	168.8
Monongalia	6.5	39.6	92.5	14.4	20.3	173.3
Ohio	1.9	8.3	19.3	3.4	5.0	37.9
Pleasants	5.7	21.4	49.2	7.2	10.5	94.0
Putnam	28.2	35.2	83.1	14.8	19.7	181.0
Ritchie	17.6	56.4	129.5	21.2	30.7	255.4
Roane	22.0	40.7	98.4	19.0	24.5	204.6
Tyler	9.1	28.2	66.4	11.5	15.4	130.6
Wayne	23.9	54.6	129.2	24.9	32.9	265.5
Wetzel	9.0	45.7	105.0	17.8	26.2	203.7
Wirt	27.5	29.4	69.4	11.5	16.5	154.3
Wood	29.6	32.5	78.6	14.0	18.7	173.4
Northwestern Unit	307.1	725.1	1,711.2	298.7	407.8	3,449.9
Total, State	995.0	2,587.1	6,498.7	1,412.8	2,021.8	13,515.4

Table 65.—*Net volume of sawtimber on commercial forest land in West Virginia, by species, county, and geographic unit, 1975*

(In millions of board feet)[a]

County	Softwoods	Select oaks	Other hard hardwoods	Yellow-poplar	Other soft hardwoods	Total all species
Barbour	16.0	50.1	109.7	43.9	45.5	265.2
Berkeley	27.8	46.8	71.0	4.2	17.5	167.3
Braxton	36.0	108.6	231.5	89.2	95.3	560.6
Grant	79.2	105.2	154.4	7.4	55.5	401.7
Hampshire	82.5	147.4	213.5	12.8	51.7	507.9
Hardy	85.9	140.1	203.1	11.8	55.2	496.1
Harrison	16.8	35.5	79.7	33.8	35.6	201.4
Jefferson	6.4	10.1	14.3	0.8	4.1	35.7
Lewis	21.1	54.4	120.3	53.3	49.9	299.0
Mineral	50.3	71.8	101.3	5.3	31.6	260.3
Morgan	37.9	44.9	61.4	2.6	22.6	169.4
Pendleton	84.3	132.9	192.8	11.8	58.9	480.7
Pocahontas	259.3	285.1	704.6	97.2	410.6	1,756.8
Preston	40.6	117.5	256.2	104.0	107.7	626.0
Randolph	237.4	369.7	806.8	232.3	452.4	2,098.6
Taylor	7.6	17.5	38.9	17.1	17.0	98.1
Tucker	104.8	122.0	247.2	119.8	167.2	761.0
Upshur	19.4	64.3	138.3	53.5	56.9	332.4
Webster	132.8	201.2	407.1	184.6	245.7	1,171.4
Northeastern Unit	1,346.1	2,125.1	4,152.1	1,085.4	1,980.9	10,689.6
Boone	9.8	112.1	372.2	118.7	45.0	657.8
Clay	26.8	109.1	220.4	72.4	41.1	469.8
Fayette	41.8	193.2	390.1	126.6	71.2	822.9
Greenbrier	147.6	324.3	682.5	169.3	223.9	1,547.6
Kanawha	66.2	267.0	526.8	172.9	98.3	1,131.2
Logan	9.4	91.2	325.2	104.2	44.3	574.3
McDowell	11.8	108.4	329.9	119.7	33.6	603.4
Mercer	25.2	120.2	236.3	75.4	42.6	499.7
Mingo	9.0	88.0	297.4	97.6	34.5	526.5
Monroe	25.2	86.2	163.3	58.9	33.3	366.9
Nicholas	47.4	190.8	384.7	148.9	103.9	875.7
Raleigh	34.3	175.5	347.8	111.8	62.7	732.1
Summers	22.7	98.3	193.0	61.8	34.9	410.7
Wyoming	60.1	139.3	277.4	95.9	56.8	629.5
Southern Unit	537.3	2,103.6	4,747.0	1,534.1	926.1	9,848.1
Brooke	3.0	11.3	23.0	4.6	5.4	47.3
Cabell	31.9	57.4	116.4	26.1	26.7	258.5
Calhoun	40.3	53.7	111.5	26.5	24.5	256.5
Doddridge	15.6	98.7	205.9	33.0	35.7	388.9
Gilmer	17.2	98.9	200.4	34.4	38.0	388.9
Hancock	3.4	11.5	24.6	4.8	6.4	50.7
Jackson	54.9	88.8	180.6	36.8	42.1	403.2
Lincoln	32.1	135.5	276.7	53.6	65.0	562.9
Marion	12.9	82.9	175.4	28.1	28.6	327.9
Marshall	14.5	49.3	103.1	21.6	26.2	214.7
Mason	66.7	67.9	141.2	31.6	30.1	337.5
Monongalia	16.2	96.2	199.0	32.2	36.8	380.4
Ohio	4.9	17.9	36.8	7.3	9.1	76.0
Pleasants	14.1	53.7	109.6	16.4	19.1	212.9

Continued

Table 65.—Continued

County	Softwoods	Select oaks	Other hard hardwoods	Yellow-poplar	Other soft hardwoods	Total all species
Putnam	64.1	78.8	160.7	32.1	34.7	370.4
Ritchie	42.4	132.5	264.8	46.8	55.5	542.0
Roane	50.6	83.9	175.2	39.8	43.0	392.5
Tyler	21.1	65.4	133.7	25.1	27.2	272.5
Wayne	53.2	117.0	236.8	53.0	56.2	516.2
Wetzel	22.4	103.9	208.3	38.6	47.3	420.5
Wirt	66.3	65.6	132.0	24.7	29.9	318.5
Wood	68.5	72.4	149.9	31.1	32.3	354.2
Northwestern Unit	716.3	1,643.2	3,365.6	648.2	719.8	7,093.1
Total, State	2,599.7	5,871.9	12,264.7	3,267.7	3,626.8	27,630.8

[a] International 1/4-inch rule.

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